

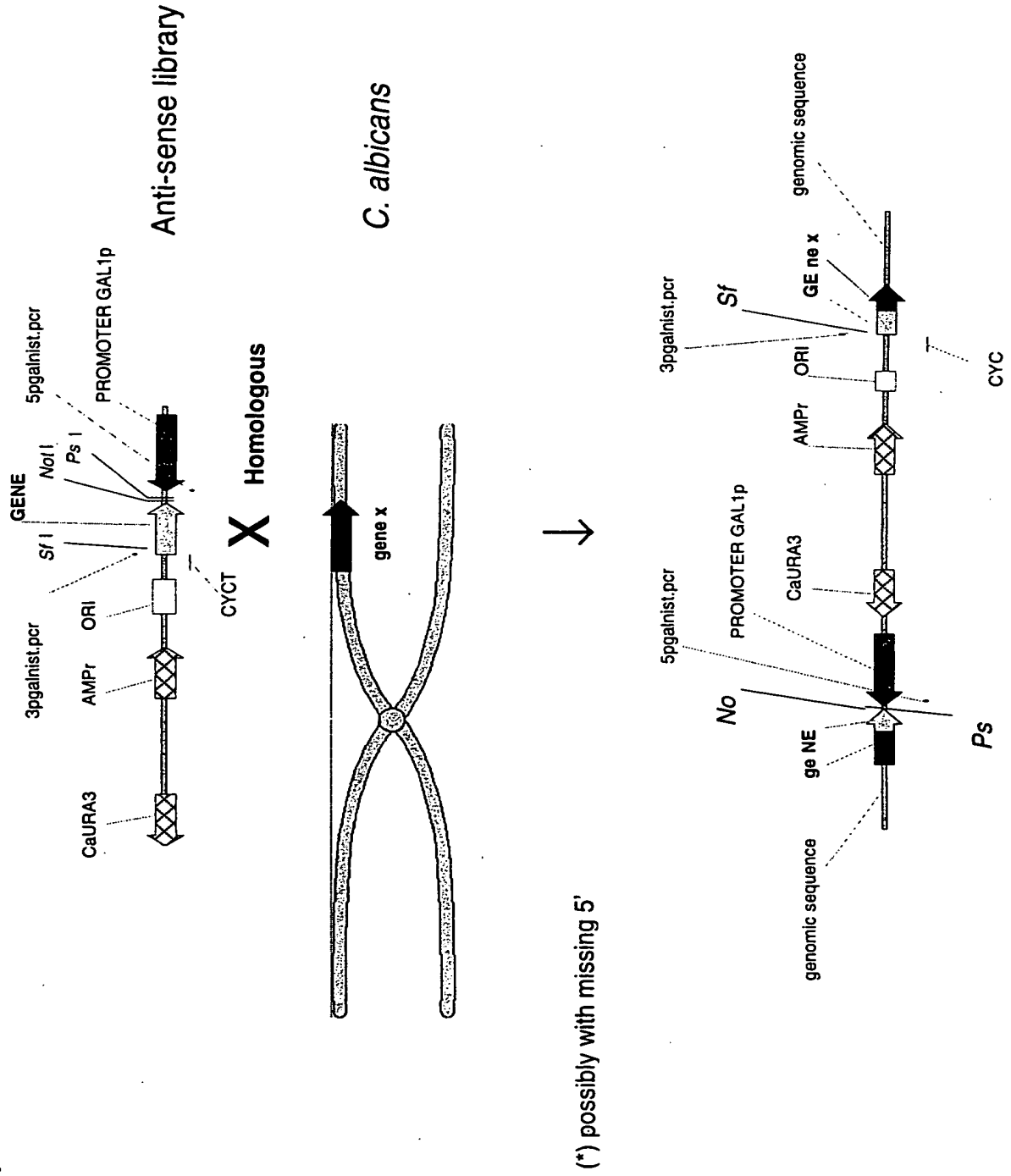
The diagram illustrates the homologous recombination process for gene targeting in *C. albicans*. It is divided into three main stages:

- Initial State:** A genomic region containing a **CaURA3** selection marker, an **AMPr** (ampicillin resistance) gene, an **ORI** (origin of replication), and a **CYC** (cycloheximide resistance) locus. A **PROMOTER GAL1p** is also present.
- Introduction of Homologous Library:** A library of DNA fragments is introduced, containing a **GENE X'** flanked by **Promoter GAL1p** and **Promoter GAL1p**. The library also includes **3pgalnist.pcr** and **5pgalnist.pcr** primers for PCR screening. Restriction sites **SfiI**, **NotI**, and **PstI** are indicated.
- Homologous Recombination:** The library fragments recombine with the genomic DNA, replacing the **CaURA3** marker with the **GENE X'** construct. The final state shows the **GENE X'** integrated into the genome, flanked by **Promoter GAL1p** and **Promoter GAL1p**. The **CaURA3** marker is removed, and the **AMPr** and **ORI** are retained. The **CYC** locus remains intact.

Anti-sense library

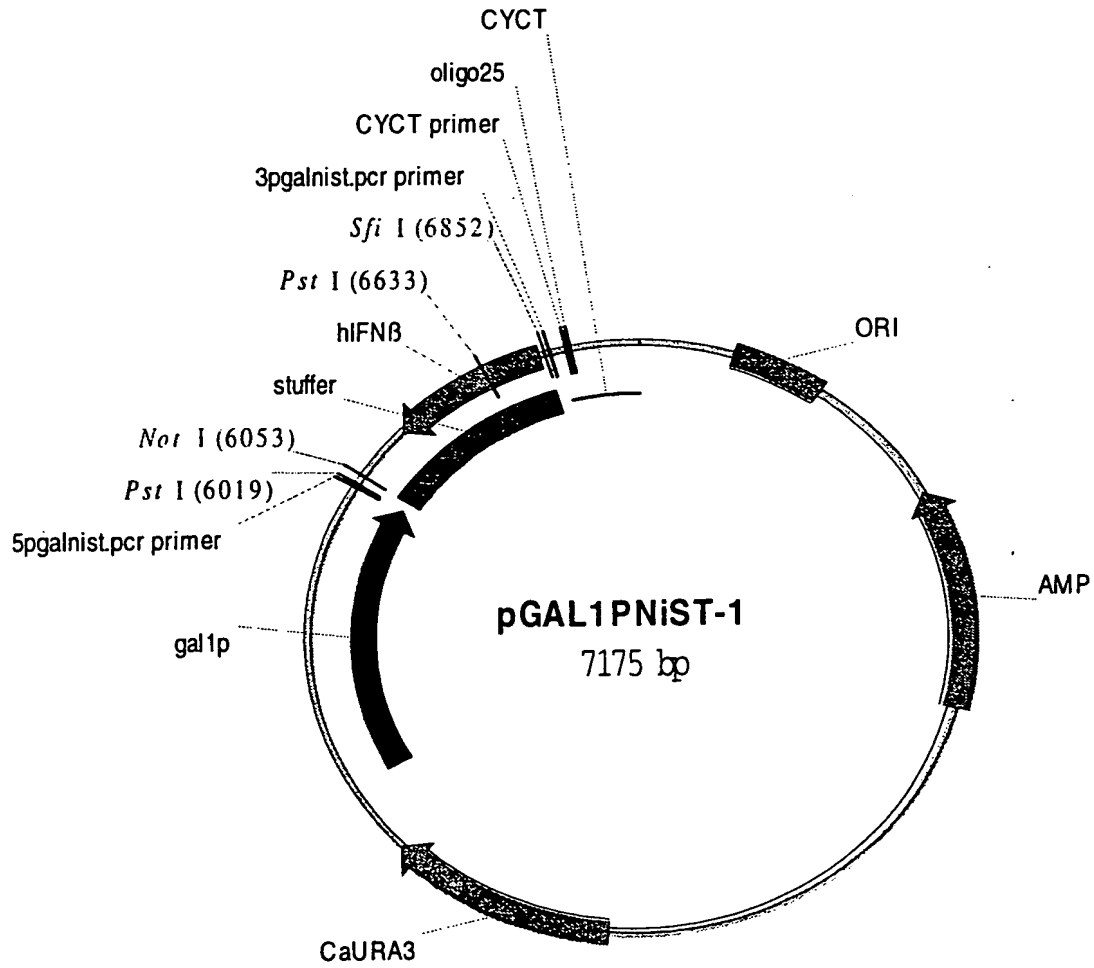
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Figure 1B:



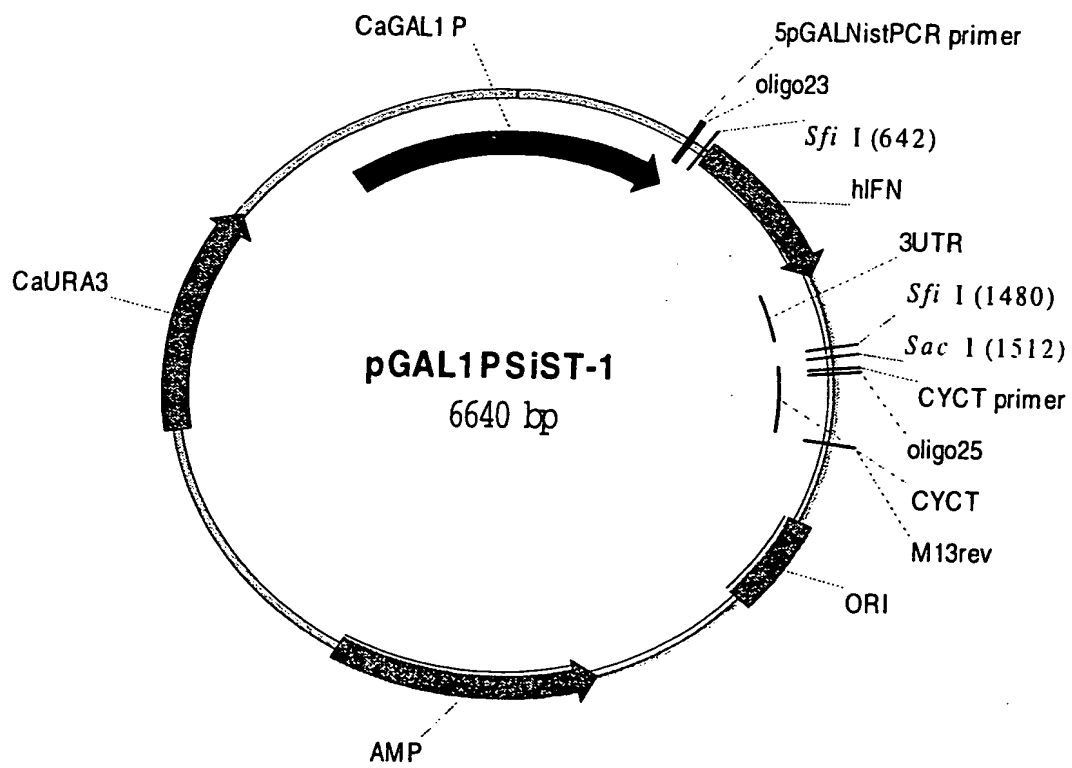
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FIG. 2(a)



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FIG. 2(b)



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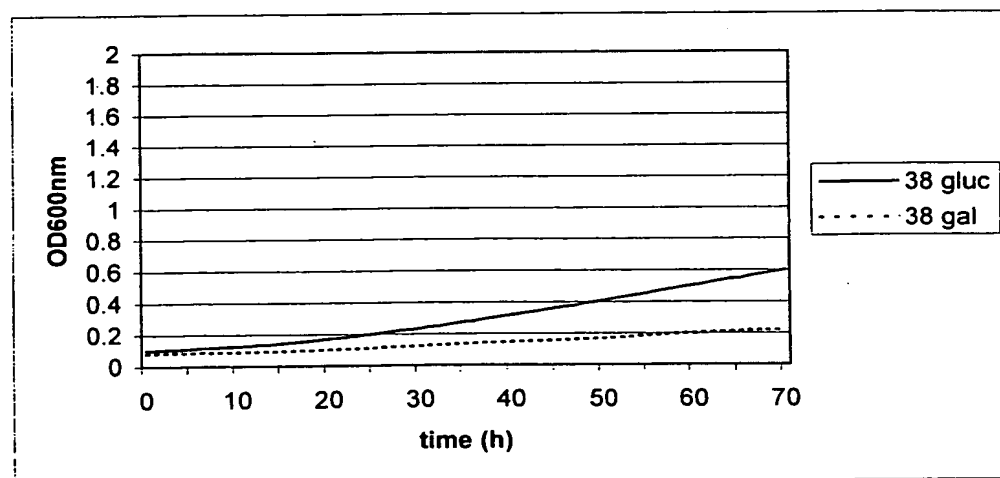
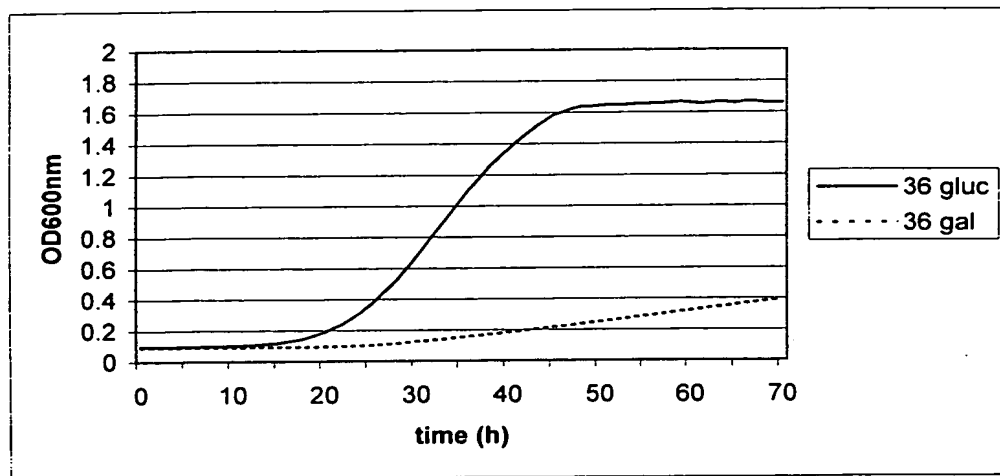
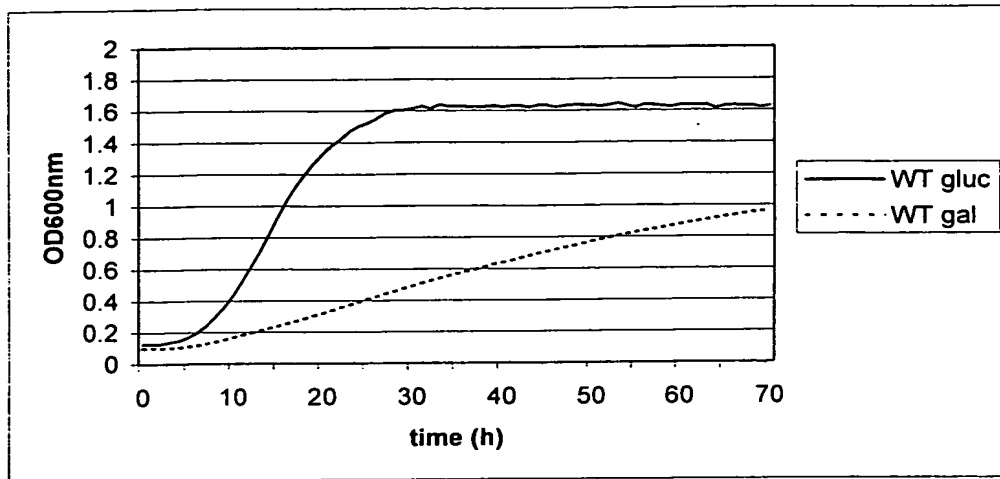


FIG. 3.

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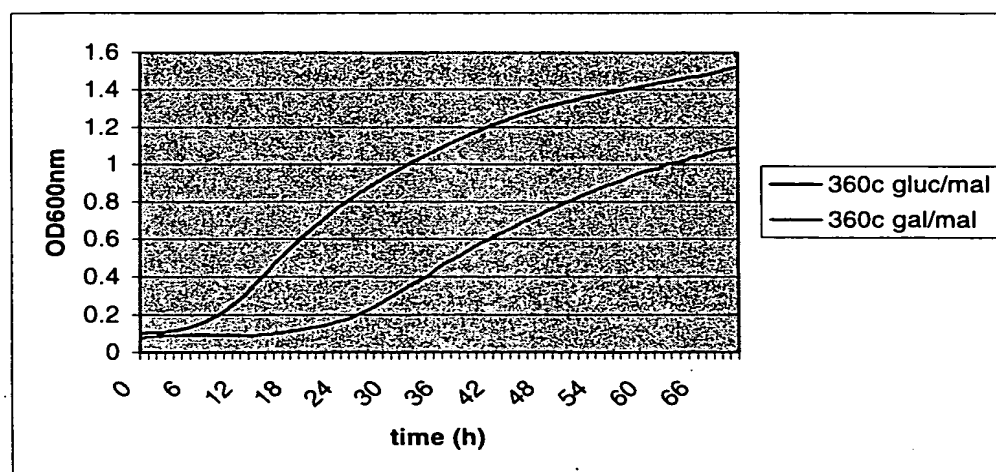
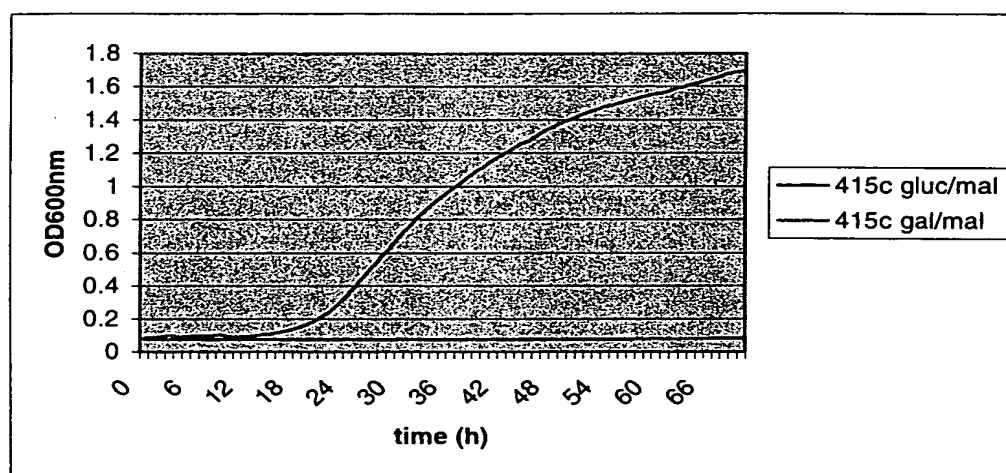
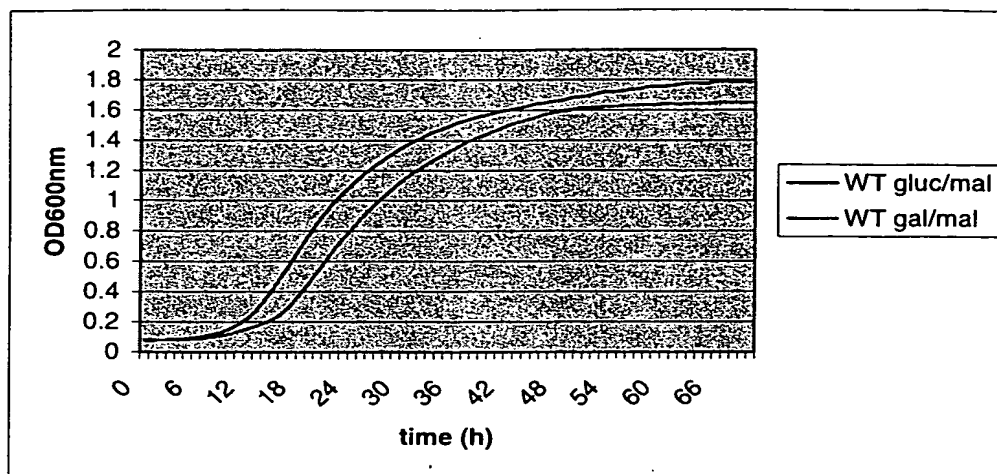
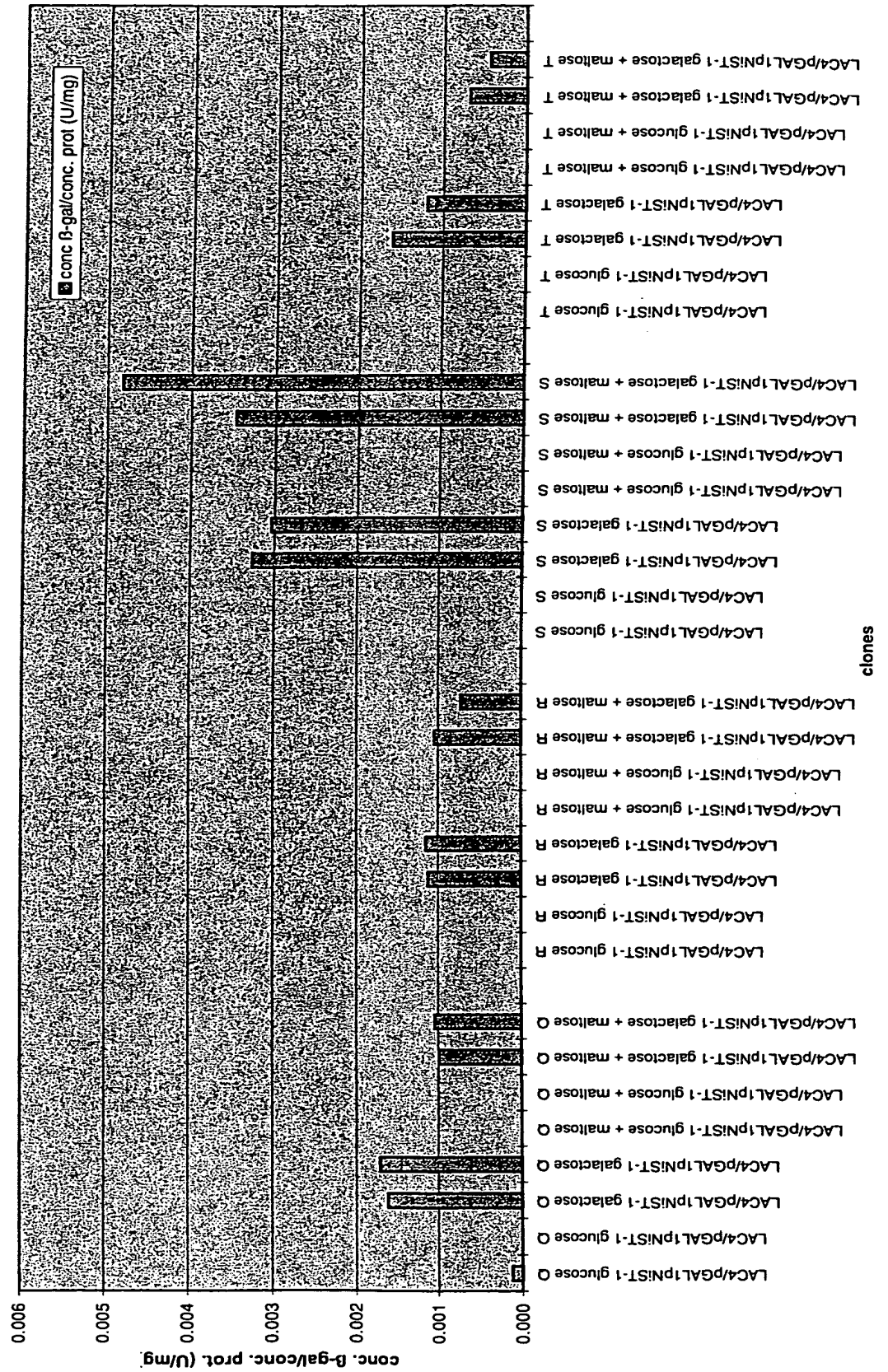


FIG. 3 (CONTINUED)

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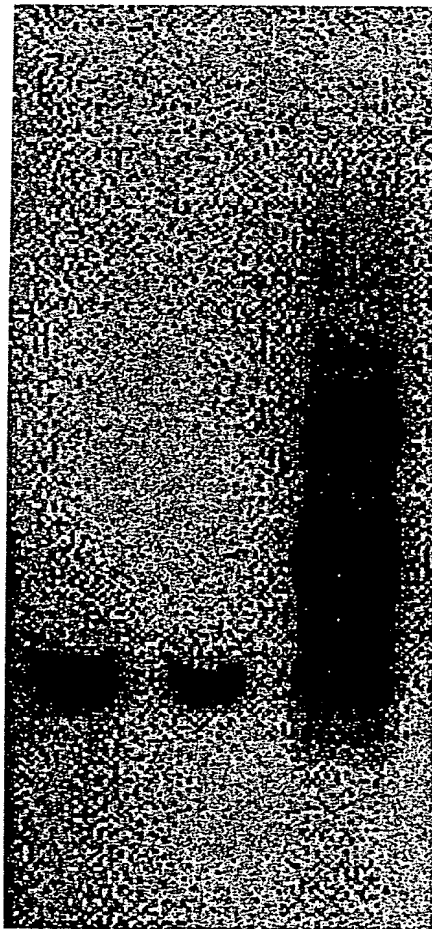
FIG. 4.

β -galactosidase activity GAL1 promoter



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Figure 5:



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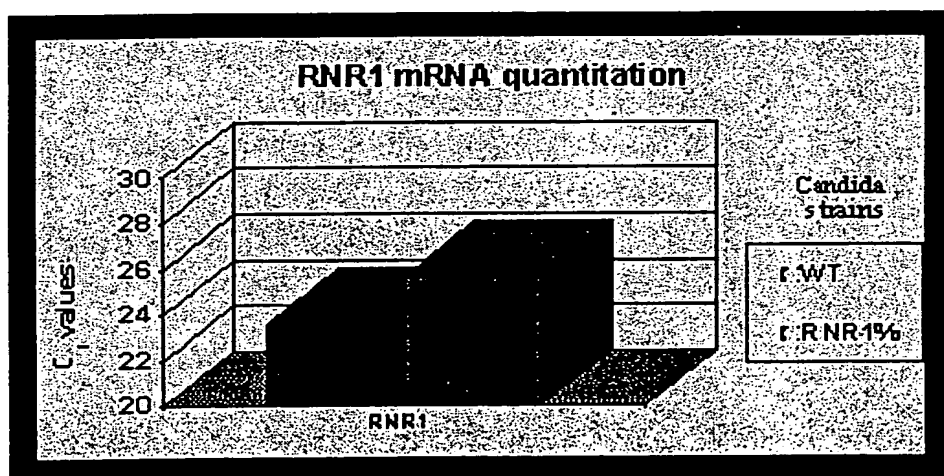
Figure 6A



1: RNR1 mutant
2: Wild type

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Figure 6B



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FIG. 7

HindIII

1 AGCTTGAGTA TTCTATAGTG TCACCTAAAT AGCTTGGCGT AATCATGGTC
TCGAACCTCAT AAGATATCAC AGTGGATTTA TCGAACCGCA TTAGTACCAG

51 ATAGCTGTTT CCTGTGTGAA ATTGTTATCC GCTCACAATT CCACACAACA
TATCGACAAA GGACACACTT TAACAATAGG CGAGTGTTAA GGTGTGTTGT

101 TACGAGCCGG AAGCATAAAG TGTAAGCCT GGGGTGCCTA ATGAGTGAGC
ATGCTCGGCC TTCGTATTTC ACATTTCGGA CCCACGGAT TACTCACTCG

151 TAACTCACAT TAATTGCGTT GCGCTCACTG CCCGCTTTCC AGTCGGGAAA
ATTGAGTGTA ATTAACGCAA CGCGAGTGAC GGGCGAAAGG TCAGCCCTTT

201 CCTGTCTGTC CAGCTGCATT AATGAATCGG CCAACGCGCG GGGAGAGGCG
GGACAGCAGC GTCGACGTAA TTACTTAGCC GGTTCGCGCG CCCTCTCCGC

251 GTTTGCGTAT TGGGCGCTCT TCCGCTTCCT CGCTCACTGA CTCGCTGCGC
CAAACGCATA ACCCGCGAGA AGGCGAAGGA GCGAGTGA CTGAGCGCGC

301 TCGGTCGTTT GGCTGCGGCG AGCGGTATCA GCTCACTCAA AGGCGGTAAT
AGCCAGCAAG CCGACGCCGC TCGCCATAGT CGAGTGAGTT TCCGCCATTA

351 ACGGTTATCC ACAGAATCAG GGGATAACGC AGGAAAGAAC ATGTGAGCAA
TGCCAATAGG TGTCTTAGTC CCTATTCG TCTTTCCTG TACTCTCGTT

401 AAGGCCAGCA AAAGGCCAGG AACCGTAAAA AGGCCGCGTT GCTGGCGTTT
TTCCGGTCTG TTTCCGGTCC TTGGCATTMT TCCGGCGCAA CGACCGCAA

451 TTCCATAGGC TCCGCCCCCC TGACGAGCAT CACAAAAATC GACGCTCAAG
AAGGTATCCG AGGCGGGGGG ACTGCTCGTA GTGTTTTTAG CTGCGAGTTC

501 TCAGAGGTGG CGAAACCCGA CAGGACTATA AAGATACCAG GCGTTTCCCC
AGTCTCCACC GCTTTGGGCT GTCTTGATAT TTCTATGGTC CGCAAAGGGG

551 CTGGAAGCTC CCTCGTGCCT TCTCCTGTTT CGACCCTGCC GCTTACCGGA
GACCTTCGAG GGAGCACGCG AGAGGACAAG GCTGGGACGG CGAATGGCCT

601 TACCTGTCCG CTTTCTCCCC TCCGGGAAGC GTGGCGCTTT CTCATAGCTC
ATGGACAGGC GGAAAGAGGG AAGCCCTTCG CACCGCGAAA GAGTATCGAG

651 ACGCTGTAGG TATCTCAGTT CCGTGTAGGT CGTTGCTCC AAGCTGGGCT
TGCGACATCC ATAGAGTCAA GCCACATCCA GCAAGCGAGG TTCGACCCGA

ApaLI

701 GTGTGCACGA ACCCCCCGTT CAGCCCGACC GCTGCGCCTT ATCCGGTAAC
CACACGTGCT TGGGGGGCAA GTCGGGCTGG CGACGCGGAA TAGGCCATTG

751 TATCGTCTTG AGTCCAACCC GGTAAAGACAC GACTTATCGC CACTGGCAGC
ATAGCAGAAC TCAGGTGGG CCAATCTGTG CTGAATAGCG GTGACCGTCG

801 AGCCACTGGT AACAGGATTA GCAGAGCGAG GTATGTAGGC GGTGCTACAG
TCGGTGACCA TTGTCCTAAT GTCTCGCTC CATACTCCG CCACGATGC

851 AGTTCTTGAA GTGGTGGCCT AACTACGGCT AACTAGAAAG GACAGTATTT
TCAAGAACTT CACCACCGGA TTGATGCCGA TGTGATCTT CTGTCATAAA

901 GGTATCTGCG CTCTGCTGAA GCGAGTTACC TTCGGAAAAA GAGTTGGTAG
CCATAGACGC GAGACGACTT CGTCAATGG AAGCCTTTTT CTCAACCATC

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FIG. 7 (CONTINUED)

951 CTCCTTGATCC GGCAAACAAA CCACCGCTGG TAGCGGTGGT TTTTGTGTTT
 GAGAACTAGG CCGTTTGTGTT GGTGGCGACC ATCGCCACCA AAAAAACAAA

 1001 GCAAGCAGCA GATTACGCGC AGAAAAAAG GATCTCAAGA AGATCCTTTG
 CGTTCGTCGT CTAATGCGCG TCTTTTTTTC CTAGAGTTCT TCTAGGAAAC

 1051 ATCTTTTCTA CGGGGTCTGA CGCTCAGTGG AACGAAACT CACGTTAAGG
 TAGAAAAGAT GCCCCAGACT GCGAGTCACC TTGCTTTTGA GTGCAATTCC

 1101 GATTTTGGTC ATGAGATTAT CAAAAAGGAT CTTACCTAG ATCCTTTTAA
 CTAAAACCAG TACTCTAATA GTTTTTCTTA GAAGTGGATC TAGGAAAATT

 1151 ATTA AAAATG AAGTTTTAAA TCAATCTAAA GTATATATGA GTAAACTTGG
 TAATTTTTAC TTCAAATTT AGTTAGATTT CATATATACT CATTTGAACC

 1201 TCTGACAGTT ACCAATGCTT AATCAGTGAG GCACCTATCT CAGCGATCTG
 AGACTGTCAA TGGTTACGAA TTAGTCACTC CGTGGATAGA GTCGCTAGAC

 1251 TCTATTTCTG TCATCCATAG TTGCCTGACT CCGGTCGTG TAGATAACTA
 AGATAAAGCA AGTAGGTATC AACGGACTGA GGGGCAGCAC ATCTATTGAT

 1301 CGATACGGGA GGGCTTACCA TCTGGCCCCA GTGCTGCAAT GATACCGCGA
 GCTATGCCCT CCCGAATGGT AGACCGGGGT CACGACGTTA CTATGGCGCT

 1351 GACCCACGCT CACCGGCTCC AGATTTATCA GCAATAAACC AGCCAGCCGG
 CTGGGTGCGA GTGGCCGAGG TCTAAATAGT CGTTATTTGG TCGGTCGGCC

 1401 AAGGGCCGAG CGCAGAAAGT GTCCTGCAAC TTTATCCGCC TCCATCCAGT
 TTCCCGGCTC GCGTCTTCAC CAGGACGTTG AAATAGGCGG AGGTAGGTCA

 1451 CTATTAAATG TTGCCGGGAA GCTAGAGTAA GTAGTTCGCC AGTTAATAGT
 GATAATTAAC AACGGCCCTT CGATCTCATT CATCAAGCGG TCAATTATCA

 1501 TTGCGCAACG TTGTTGCCAT TGCTACAGGC ATCGTGGTGT CACGCTCGTC
 AACGCGTTGC AACAACGGTA ACGATGTCCG TAGCACCACA GTGCGAGCAG

 1551 GTTGGGTATG GCTTCATTCA GCTCCGGTTC CCAACGATCA AGGCGAGTTA
 CAAACCATAC CGAAGTAAGT CGAGGCCAAG GGTGCTAGT TCCGCTCAAT

 1601 CATGATCCCC CATGTTGTGC AAAAAAGCGG TTAGCTCCTT CGGTCCTCCG
 GTACTAGGGG GTACAACACG TTTTTCGCC AATCGAGGAA GCCAGGAGGC

 1651 ATCGTTGTCA GAAGTAAGTT GGCCGCAGTG TTATCACTCA TGGTTATGGC
 TAGCAACAGT CTTCAATTCAA CCGGCGTCAC AATAGTGAGT ACCAATACCG

 1701 AGCACTGCAT AATTCTCTTA CTGTCATGCC ATCCGTAAGA TGCTTTTCTG
 TCGTGACGTA TTAAGAGAAT GACAGTACGG TAGGCATTCT ACGAAAAGAC

 1751 TGACTGGTGA GTACTCAACC AAGTCATTCT GAGAATAGTG TATGCGGCGA
 ACTGACCACT CATGAGTTGG TTCAGTAAGA CTCTTATCAC ATACGCCGCT

 1801 CCGAGTTGCT CTTGCCCGGC GTCAATACGG GATAATACCG CGCCACATAG
 GGCTCAACGA GAACGGGCGG CAGTTATGCC CTATTATGGC GCGGTGTATC

 1851 CAGA ACTTTA AAAGTGCTCA TCATTGGAAA ACGTTCCTCG GGGCGAAAAC
 GTCTTGAAAT TTTCACGAGT AGTAACCTTT TGCAAGAAGC CCCGCTTTTG

FIG. 7. (CONTINUED)

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ApaLI

1901 TCTCAAGGAT CTTACCGCTG TTGAGATCCA GTTCGATGTA ACCCACTCGT
AGAGTTCCTA GAATGGCGAC AACTCTAGGT CAAGCTACAT TGGGTGAGCA

ApaLI

1951 GCACCCAAC TATCTTCAGC ATCTTTTACT TTCACCAGCG TTTCTGGGTG
CGTGGGTGTA CTAGAAGTCG TAGAAAATGA AAGTGGTCGC AAAGACCCAC

2001 AGCAAAAACA GGAAGGCAAA ATGCCGCAAA AAAGGGAATA AGGGCGACAC
TCGTTTTTGT CCTTCCGTTT TACGGCGTTT TTTCCCTTAT TCCCGCTGTG

2051 GGAAATGTG AATACTCATA CTCTTCCTTT TTCAATATTA TTGAAGCATT
CCTTTACAAC TTATGAGTAT GAGAAGGAAA AAGTTATAAT AACTTCGTAA

2101 TATCAGGGTT ATTGTCTCAT GAGCGGATAC ATATTTGAAT GTATTTAGAA
ATAGTCCCAA TAACAGAGTA CTCGCCTATG TATAAACTTA CATAAATCTT

2151 AAATAAACAA ATAGGGGTTT CGCGCACATT TCCCCGAAAA GTGCCACCTG
TTTATTTGTT TATCCCAAG GCGCGTGTA AGGGGCTTTT CACGGTGGAC

2201 ACGTCTAAGA AACCATTATT ATCATGACAT TAACCTATAA AAATAGGCGT
TGCAGATTCT TTGGTAATA TAGTACTGTA ATTGGATATT TTTATCCGCA

2251 ATCAGGAGGC CCTTTCGTCT CGCGCGTTTC GGTGATGACG GTGAAAACCT
TAGTGCTCCG GGAAAGCAGA GCGCGCAAAG CCACTACTGC CACTTTTGGA

2301 CTGACACATG CAGCTCCCGG AGACGGTCAC AGCTTGTC TGTAAGCGGATG
GACTGTGTAC GTCGAGGGCC TCTGCCAGTG TCGAACAGAC ATTCCGCTAC

2351 CCGGGAGCAG ACAAGCCCGT CAGGGCGCGT CAGCGGGTGT TGGCGGGTGT
GGCCCTCGTC TGTTCCGGCA GTCCCGCGCA GTCGCCACA ACCGCCACA

ApaLI

2401 CGGGGCTGGC TTAACATATG GGCATCAGAG CAGATTGTAC TGAGAGTGCA
GCCCCGACCG AATTGATACG CCGTAGTCTC GTCTAACATG ACTCTCACGT

ApaLI

2451 CCATATGCGG TGTGAAATAC CGCACAGATG CGTAAGGAGA AAATACCGCA
GGTATACGCC ACACCTTATG GCGTGTCTAC GCATTCTCT TTTATGGCGT

2501 TCAGGCGAAA TTGTAAACGT TAATATTTTG TTAAATTCG CGTTAAATAT
AGTCCGCTTT AACATTTGCA ATTATAAAAC AATTTTAAGC GCAATTTATA

2551 TTGTTAAATC AGCTCATTTT TTAACCAATA GGCCGAAATC GGCAAAATCC
ACAATTTAG TCGAGTAAAA AATTGGTTAT CCGGCTTTAG CCGTTTATAG

2601 CTTATAAATC AAAAGAATAG ACCGAGATAG GGTGAGTGT TGTTCCAGTT
GAATATTTAG TTTTCTTATC TGGCTCTATC CCAACTCACA ACAAGGTCAA

2651 TGAACAAGA GTCCACTATT AAGAACGTG GACTCCAACG TCAAAGGGCG
ACCTTGTTCT CAGGTGATAA TTTCTGCAC CTGAGGTTGC AGTTTCCCGC

2701 AAAAACCCTC TATCAGGGCG ATGGCCCACT ACGTGAACCA TCACCCAAAT
TTTTTGGCAG ATAGTCCCGC TACCGGTGA TGCATTGGT AGTGGGTTTA

2751 CAAGTTTTTT GCGGTCGAGG TCCCGTAAAG CTCTAAATCG GAACCCATAA
GTTCAAAAAA CGCCAGCTCC ACGGCATTTT GAGATTTAGC CTTGGGATTT

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FIG. 7 (CONTINUED)

2801	GGGAGCCCC	GATTTAGAGC	TTGACGGGA	AAGCCGGCGA	ACGTGGCGAG
	CCCTCGGGG	CTAAATCTCG	AACTGCCCC	TTCGGCCGCT	TGCACCGCTC
2851	AAAGGAAGGG	AAGAAAGCGA	AAGGAGCGGG	CGCTAGGGCG	CTGGCAAGTG
	TTTCCTTCCC	TTCTTTCGCT	TTCTCGCCC	GCGATCCCGC	GACCGTTCAC
2901	TAGCGGTCAC	GCTGCGCGTA	ACCACCACAC	CCGCCGCGCT	TAATGCGCGG
	ATCGCCAGTG	CGACGCGCAT	TGGTGGTGTG	GGCGGCGCGA	ATTACGCGGC
2951	CTACAGGGCG	CGTCCATTCTG	CCATTTCAGGC	TGCGCAACTG	TTGGGAAGGG
	GATGTCCCGC	GCAGGTAAGC	GGTAAGTCCG	ACGCGTTGAC	AACCCCTCCC
3001	CGATCGGTGC	GGGCCTCTTC	GCTATTACGC	CAGCTGGCGA	AAGGGGGATG
	GCTAGCCACG	CCCGGAGAAG	CGATAATGCG	GTCGACCGCT	TTCCCCCTAC
3051	TGCTGCAAGG	CGATTAAGTT	GGGTAACGCC	AGGGTTTTCC	CAGTCACGAC
	ACGACGTTCC	GCTAATTCAA	CCCATTGCGG	TCCAAAAGG	GTCAGTGCTG
3101	GTTGTAAAAC	GACGGCCAGT	GAATTGTAAT	ACGACTCACT	ATAGGGCGAA
	CAACATTTTG	CTGCCGGTCA	CTTAACATTA	TGCTGAGTGA	TATCCCGCTT
3151	TTGGTTTTCC	AATGATGAGC	ACTTTTAAAG	TTCTGCTATG	TGGCGCGGTA
	AACCAAAAGG	TTACTACTCG	TGAAAATTTT	AAGACGATAC	ACCGCGCCAT
3201	TTATCCCGTG	TTGACGCCGG	GCAAGAGCAA	CTCGGTCGCC	GCATACACTA
	AATAGGGCAC	AACTGCGGCC	CGTTCTCGTT	GAGCCAGCGG	CGTATGTGAT
3251	TTCTCAGAAT	GACTTGGTTG	AGTACTAATA	GGAATTGATT	TGGATGGTAT
	AAGAGTCTTA	CTGAACCAAC	TCATGATTAT	CCTTAACATA	ACCTACCATA
3301	AAACGGAAAC	AAAAAAAAGA	GCTGGTACTA	CTTTCTTTAA	AATTATTTTA
	TTTGCCTTTG	TTTTTTTTCT	CGACCATGAT	GAAAGAAATT	TTAATAAAAT
3351	TTATTTGATT	TTATTTAATA	GTATATATTA	TATTTTGAAC	GTAGATTATT
	AATAAACTAA	AATAAAATTAT	CATATATAAT	ATAAACTTG	CATCTAATAA
3401	TTGTTGAAAG	TTGCTGTAGT	GCCATTGATT	CGTAACACTA	ATTCTGTATT
	AACAACCTTC	AACGACATCA	CGGTAACATA	GCATTGTGAT	TAAGACATAA
3451	AGTCATTCCCT	CTTGTTTGAT	AGTATCCAAA	AAAACGGCTA	TTTTTTTGCA
	TCAGTAAGGA	GAACAAACTA	TCATAGGTTT	TTTTGCCGAT	AAAAAACGCT
3501	ATCTTATTTT	CTGCATATTA	TACAGATAAC	ATAATGAAAG	AAAAAATCTT
	TAGAATAAAG	GACGTATAAT	ATGTCTATTG	TATTACTTTC	TTTTTTAGAA
3551	TTTTTTTGTT	CTTCAATGAT	GATTTCAACC	ATTCTTTTAA	ACATTGATCA
	AAAAAAACAA	GAAGTTACTA	CTAAAGTTGG	TAAGAAAATT	TGTAACCTAGT
3601	ATTCCTGAGC	AACAACCCCA	TACACACTGG	TTTATATACC	GCCCCTTTTA
	TAAGGACTCG	TTGTTGGGGT	ATGTGTGACC	AAATATATGG	CGGGGAAAAAT
3651	CAGTTGAAGA	AAGAAATAGA	AATAGAAATA	GCAAACAAAA	GATATGACAG
	GTCAACTTCT	TTCTTTATCT	TTATCTTTAT	CGTTTGTPTT	CTATACTGTC
3701	TCAACACTAA	GACCTATAGT	GAGAGAGCAG	AAACTCATGC	CTCACCAGTA
	AGTTGTGATT	CTGGATATCA	CTCTCTCGTC	TTTGAGTACG	GAGTGGTCAT
3751	GCACAGCGAT	TATTTTCGATT	AATGGAACCTG	AAGAAAACCA	ATTTATGTGC
	CGTGTCGCTA	ATAAAGCTAA	TTACCTTGAC	TTCTTTTGGT	TAAATACACG

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FIG. 7. (CONTINUED)

EcoRI

3801 ATCAATTGAC GTTGATACCA CTAAGGAATT CCTTGAATTA ATTGATAAAT
 TAGTTAACTG CAACTATGGT GATTCCTTAA GGAACCTAAT TAACTATTTA

 3851 TAGGTCCTTA TGTATGCTTA ATCAAGACTC ATATTGATAT AATCAATGAT
 ATCCAGGAAT ACATACGAAT TAGTTCCTGAG TATAACTATA TTAGTTACTA

 3901 TTTTCCTATG AATCCACTAT TGAACCATT TTAGAACTTT CACGTAAACA
 AAAAGGATAC TTAGGTGATA ACTTGGTAAT AATCTTGAAA GTGCATTTGT

 3951 TCAATTTATG ATTTTTGAAG ATAGAAAATT TGCTGATATT GGTAAATACCG
 AGTTAAATAC TAAAACTTC TATCTTTTAA ACGACTATAA CCATTATGGC

 4001 TAAAGAAACA ATATATTGGT GGAGTTTATA AAATTAGTAG TTGGGCAGAT
 ATTTCTTTGT TATATAACCA CCTCAAATAT TTTAATCATC AACCCGTCTA

 4051 ATTACCAATG CTCATGGTGT CACTGGGAAT GGAGTGGTTG AAGGATTAAA
 TAATGGTTAC GAGTACCACA GTGACCCTTA CCTCACCAAC TTCCTAATTT

 4101 ACAGGGAGCT AAAGAAACCA CCACCAACCA AGAGCCAAGA GGGTTATTGA
 TGTCCCTCGA TTTCTTTGGT GGTGGTTGGT TCTCGGTTCT CCAATAACT

 4151 TGTTAGCTGA ATTATCATCA GTGGGATCAT TAGCATATGG AGAATATTCT
 ACAATCGACT TAATAGTAGT CACCCTAGTA ATCGTATACC TCTTATAAGA

 4201 CAAAAAATG TTGAAATTGC TAAATCCGAT AAGGAATTTG TTATTGGATT
 GTTTTGTGAC AACTTTAACG ATTTAGGCTA TTCCTTAAAC AATAACCTAA

 4251 TATTGCCCAA CGTGATATGG GTGGCCAAGA AGAAGGATTT GATTGGCTTA
 ATAACGGGTT GCACTATACC CACCGGTTCT TCTTCCTAAA CTAACCGAAT

 4301 TTATGACACC TGGAGTTGGA TTAGATGATA AAGGTGATGG ATTAGGACAA
 AATACTGTGG ACCTCAACCT AATCTACTAT TTCCACTACC TAATCCTGTT

 4351 CAATATAGAA CTGTTGATGA AGTTGTTAGC ACTGGAAGT ATATTATCAT
 GTTATATCTT GACAACTACT TCAACAATCG TGACCTTGAC TATAATAGTA

 4401 TGTGTTGAGA GGATTGTTTG GTAAAGGAAG AGATCCAGAT ATTGAAGGTA
 ACAACCATCT CCTAACAAAC CATTTCTTTC TCTAGGTCTA TAACTTCCAT

 4451 AAAGGTATAG AAATGCTGGT TGAATGCTT ATTTGAAAAA GACTGGCCAA
 TTTCCATATC TTTACGACCA ACCTTACGAA TAACTTTTTT CTGACCGGTT

 4501 TTATAAATGT GAAGGGGGAG ATTTTCACTT TATTAGATTT GTATATATGT
 AATATTTACA CTTCCCCCTC TAAAAGTGAA ATAATCTAAA CATATATACA

 4551 AGAATAAATA AATAAATAAG TAAATAAAT AATTAAATAA GGGTGGTAAT
 TCTTATTAT TTATTTATTC AATTATTTA TTAATTTATT CCCACCATT

 4601 TATTACTATT TACAATCAAA GGTGGTCCTT CTAGCTGTAA TCCGGGCAGC
 ATAATGATAA ATGTTAGTTT CCACCAGGAA GATCGACATT AGGCCCGTCG

 4651 GCAACGGAAC ATTCATCAGT GTAAAAATGG AATCAATAAA GCCCTGCGCA
 CGTTGCCTTG TAAGTAGTCA CATTTTACC TTAGTTATTT CGGGACGCGT

 4701 GCGCGCAGGG TCAGCCTGAA TACGCGTTTA ATGACCAGCA CAGTCGTGAT
 CGCGCGTCCC AGTCGGACTT ATGCGCAAAT TACTGGTCGT GTCAGCACTA

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FIG. 7 (CONTINUED)

4751 GGCAAGGTCA GAATAGCCCA AGTCGGCCGA GGGGCCTGTA CAGTGAGGGA
CCGTTCCAGT CTTATCGGGT TCAGCCGGCT CCCC GGACAT GTCACTCCCT

4801 AGATCTGATA TTGACGAAGA GGAACCAATG TAACGTTACA CTGAAGAAAA
TCTAGACTAT AACTGCTTCT CTTTGGTTAC ATTGCAATGT GACTTCTTTT

4851 CACACAATAA ACGGAAGAA ACGGTGTAAA AGTGTGAAAA TAATTTTGA
GTGTGTATT TGCCCTTCTT TGCCACATTT TCACACTTTT ATTAAAACT

4901 ATATCATTTT CTTTGGTTTA ATTCCAAACG AAACGTGTTT TTTTATGAGA
TATAGTAAAG GGAACCAAAT TAAGGTTTGC TTTGCACAAA AAAATCTCT

EcoRI

ApaLI

4951 ATGGGAATTC TTATTGGATG TCTAGATTGT TTGTTTACTC CAGACTGTGC
TACCCCTAAG AATAACCTAC AGATCTAACA AACAAATGAG GTCTGACACG

ApaLI

5001 ACAAAAACGT TTGGATGGAT GATCAGAAGA TATTTTTAGG CTTAGCTCTA
TGTTTTTGCA AACCTACCTA CTAGTCTTCT ATAAAAATCC GAATCGAGAT

5051 AATATAAGAA ATGATGCTTG AAAAACCAGA CAGAAATTGA GTTTCAAAAA
TTATATTCTT TACTACGAAC TTTTGGTCT GTCTTTAACT CAAAGTTTTT

5101 TTGGTAATGT GAGGTATTAG TCAACTAACC AAATAACAAT GCAAACCGGT
AACCATTACA CTCCATAATC AGTTGATTGG TTTATTGTTA CGTTTGCCA

5151 TGATACATTT CATTTTGAAA ATAATGAAAC TGGAAATTGGA TGACCAGCAC
ACTATGTAAA GTAAAACTTT TATTACTTTG ACCTTAACCT ACTGGTCGTG

5201 ACAAAACAT AAAGTAATTA TCGGAATTAG AAGCGAACAT AGAGGAGTAC
TGTTGTGTA TTTCATTAAT ACCCTTAATC TTCGCTTGTA TCTCCTCATG

5251 TTGGCCACGA ACAGAATACA AGTGGGAACA CTATTTTCTC CATTTGTTTA
AACCGGTGCT TGTCTTATGT TCACCCTTGT GATAAAAGAG GTAACAAAAT

5301 GTTCTGTTTT TTTGTCAGCC TAGTTTGTG CTATGTGTAA AAAATATTGC
CAAGACAAAA AAACAGTCGG ATCAAAACAC GATACACATT TTTTATAACG

HindIII

5351 CAAGAAAAAA AGCTTGTTTT GTGCCAGTG TCCGAAAAAA ATTTTGGGGA
GTTCTTTTTT TCGAACAAA CACCGGTCAC AGGCTTTTTT TAAAACCCCT

5401 ATCTTCGGAT TAATTTATGT TTTCATTCCA TCGGGGAAAG TGGGGGGGAA
TAGAAGCCTA ATTAAATACA AAAGTAAGGT AGCCCCTTTC ACCCCCCCTT

5451 AAAATTTTAA GCAGTTCACA AAACCTTCCA AAAATATAT GGACAAAGAT
TTTTAAAATT CGTCAAGTGT TTTGGAAGGT TTTTATATA CCTGTTTCTA

5501 GATTGTATTT TCCCGACACC AAAATCATAA TTAATTATGA GAAAGTTAAA
CTAACATAAA AGGGCTGTGG TTTAGTATT AATTAATACT CTTTCAATTT

5551 TGTAACGTTA CAATTTATGT TTATTTGAAG GTGAAAAGCG ATTTATGATT
ACATTGCAAT GTTAAATACA AATAAACTTC CACTTTTCGC TAAATACTAA

5601 TTTCCGAAAT GAAAATTTTT TTAGGTTTA TTTTTTTTGT CGGGCAAAGA
AAAGGCTTTA CTTTTAAAAA AATCCAAAT AAAAAACA GCCCGTTTCT

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FIG. 7. (CONTINUED)

EcoRI

5651 AAAACTGAAC AAGGATTATT AAAATTTTGT GTGTTTGTGT GTGTCTGGAG
TTTGTACTTG TTCCTAATAA TTTTAAAAAC CACAAACAAA CACAGACCTC

EcoRI

5701 AATTCATTCC TCTCTCATCT TCACACAATG TTTAGACATC TGACACGATT
TTAAGTAAGG AGAGAGTAGA AGTGTGTAC AAATCTGTAG ACTGTGCTAA

5751 CATGATAGTT CGGTTTCCGG GGTGGTGTGT TAGTTTTCGT TTTCTTTTT
GTACTATCAA GCCAAAGGCC CCAACCACAA ATCAAAAGCA AAAAGAAAAA

5801 TTTTGAAAG AATGTTTTAG CTCATTGGTT TTCTTTCTTC ATTCAATAGT
AAAACCTTTC TTACAAAATC GAGTAACCAA AAGAAAGAAG TAAGTTATCA

5851 TTTGAAAGAA TTTGCCCACT TGTATTACA ATCATATAAA ATTAACTTT
AAACTTTCTT AAACGGGTGA ACAATAATGT TAGTATATTT TAATTTGAAA

5901 GATATAAAAT AGAGTTTGAA AGTTTCCAG ATCTTTTTTG ATTTCTTTGT
CTATATTTTA TCTCAAACCTT TCAAAGGTC TAGGAAAAAC TAAAGAAACA

5951 AAATTTTTTT TTCTCCACA TATACACACA TACAAACCGA TTTTATAAG
TTTAAAAAAA AAGAGGGTGT ATATGTGTGT ATGTTTGGCT AAAAATATTC

PstI

AvaI

BamHI

6001 AAAGAGTTAT ACCCTGCAGC TCGACCTCGA GGGATCCGGG CCCTCTAGAT
TTTCTCAATA TGGGACGTCG AGCTGGAGCT CCCTAGGCCC GGGAGATCTA

AvaI

6051 GCGGCCGCTA GGCCTCGAGG GACTTTTGCA CCAAAAATAA TTTATTTTCC
CGCCGGCGAT CCGGAGCTCC CTGAAAACGT GGTTTTTATT AAATAAAGG

6101 AAAATAAAAT TTAATAAAT AAAAATAACT CATAATTTAA TAAAAATTC
TTTTATTTTA AATTTATTTA TTTTATTGA GTATTAAAT ATTITTAAG

6151 AAAATCTTCT AGTGTCCTTT CATATGCAGT ACATTAGCCA TCAGTCACTT
TTTTAGAAGA TCACAGGAAA GTATACGTCA TGTAATCGGT AGTCAGTGAA

6201 AAACAGCATC TGCTGGTTGA AGAATGCTTG AAGCAATTGT CCAGTCCAG
TTTGTGCTAG ACGACCAACT TCTTACGAAC TTCGTTAACA GGTCAGGGTC

6251 AGGCACAGGC TAGGAGATCT TCAGTTTCGG AGGTAACCTG TAAGTCTGTT
TCCGTGTCCG ATCCTCTAGA AGTCAAAGCC TCCATTGGAC ATTCAGACAA

6301 AATGAAGTAA AAGTTCCTTA GGATTCCAC TCTGACTATG GTCCAGGCAC
TTACTTCATT TTCAAGGAAT CCTAAAGGTG AGACTGATAC CAGGTCCGTG

6351 AGTGACTGTA CTCCTTGGCC TTCAGGTAAT GCAGAACTCT CCCATAATAT
TCACTGACAT GAGGAACCGG AAGTCCATTA CGTCTTAGGA GGGTATTATA

6401 CTTTTCAGGT GCAGACTGCT CATGAGTTTT CCCCTGGTGA AATCTTCTTT
GAAAAGTCCA CGTCTGACGA GTACTCAAAA GGGGACCACT TTAGAAGAAA

6451 CTCCAGTTTT TCTTCCAGGA CTGTCTTCAG ATGGTTTATC TGATGATAGA
GAGGTCAAAA AGAAGGTCCT GACAGAAGTC TACCAAATAG ACTACTATCT

6501 CATTAGCCAG GAGGTTCTCA ACAATAGTCT CATTCCAGCC AGTGCTAGAT
GTAATCGGTC CTCCAAGAGT TGTATCAGA GTAAGGTCGG TCACGATCTA

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FIG. 7. (CONTINUED)

6551 GAATCTTGTC TGAAAATAGC AAAGATGTTT TGGAGCATCT CATAGATGGT
CTTAGAACAG ACTTTTATCG TTTCTACAAG ACCTCGTAGA GTATCTACCA

PstI

6601 CAATGCGGCG TCCTCCTTCT GGAAGTGTG CAGCTGCTTA ATCTCCTCAG
GTTACGCCGC AGGAGGAAGA CCTTGACGAC GTCGACGAAT TAGAGGAGTC

6651 GGATGTCAAA GTTCATCCTG TCCTTGAGGC AGTATTCAAG CCTCCCATTC
CCTACAGTTT CAAGTAGGAC AGGAACTCCG TCATAAGTTC GGAGGGTAAG

6701 AATTGCCACA GGAGCTTCTG AACTGAAAA TTGCTGCTTC TTTGTAGGAA
TTAACGGTGT CCTCGAAGAC TGTGACTTTT AACGACGAAG AAACATCCTT

6751 TCCAAGCAAG TTGTAGCTCA TGGAAAGAGC TGTAGTGGAG AAGCACAACA
AGGTTTCGTT AACATCGAGT ACCTTTCTCG ACATCACCTC TTCGTGTTGT

AvaI

6801 GGAGAGCAAT TTGGAGGAGA CACTTGTGTTG TCATGTTTCT CGAGGCCTTT
CCTCTCGTTA AACCTCCTCT GTGAACAACC AGTACAAGGA GCTCCGGAAG

BamHI

6851 TTGGCCAGCT GCGCCCTGCT GCGCGACGGC GAGCTGCTCA CCACCCAGGA
AACCAGTCTGA CCGCGGACGA CGCGCTGCCG CTCGACGAGT GGTGGGTCCT

BamHI

6901 TCCGTCCCCC TTTTCCTTTG TCGATATCAT GTAATTAGTT ATGTCACGCT
AGGCAGGGGG AAAAGGAAAC AGCTATAGTA CATTAATCAA TACAGTGCGA

6951 TACATTACAG CCTCCCCC ACATCCGCTC TAACCGAAAA GGAAGGAGTT
ATGTAAGTGC GGGAGGGGGG TGTAGGCGAG ATTGGCTTTT CCTTCCTCAA

7001 AGACAACCTG AAGTCTAGGT CCCTATTAT TTTTATATAG TTATGTTAGT
TCTGTTGGAC TTCAGATCCA GGGATAAATA AAAAAATATC AATACAATCA

7051 ATTAAGAACG TTATTTATAT TCCTAAATTT TCTTTTTTTT CTGTACAGAC
TAATTCCTGC AATAAATATA AAGTTTAAAA AGAAAAAATA GACATGCTCTG

7101 GCGTGTACGC ATGTAACATT AACTGAAAA CCTTGCTTGA GAAGGTTTGT
CGCACATGCG TACATTGTAA TATGACTTTT GGAACGAACCT CTTCCAAAAC

HindIII

7151 GGACGCTCGA AGGCTTTAAT TTGCA
CCTGCGAGCT TCCGAAATTA AACGT

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FIG. 8.

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1  TTCCATCGGG GAAAGTGGGG GGGAAAAAAT TTTAAGCAGT TCACAAAACC
   AAGGTAGCCC CTTTCACCCC CCCTTTTTTA AAATTCGTCA AGTGTMTTGG
.....
51 TTCAAAAAA TATATGGACA AAGATGATTG TATTTTCCCG ACACCAAAAT
   AAGGTTTTTT ATATACCTGT TTCTACTAAC ATAAAAGGGC TGTGGTTTTA
.....
101 CATAATTAAT TATGAGAAAG TTAAATGTAA CGTTACAATT TATGTTTATT
   GTATTAATTA ATACTCTTTC AATTTACATT GCAATGTAA ATACAAATAA
.....
151 TGAAGGTGAA AAGCGATTTA TGATTTTCC GAAATGAAA TTTTTTTAG
   ACTTCCACTT TCGCTAAAT ACTAAAAAGG CTTTACTTTT AAAAAAATC
.....
201 GTTTATTTTT TTTGTCGGGC AAAGAAAAAC TGAACAAGGA TTATTAAAAT
   CAAATAAAAA AAACAGCCCG TTTCTTTTTG ACTTGTTCCT AATAATTTTA
.....
                                EcoRI
                                -----
251 TTTTGGTGTT TGTTTGTC TGGAGAAATC ATTCTCTCT CATCTTCACA
   AAAACCACAA ACAAACACAG ACCTCTTAAG TAAGGAGAGA GTAGAAGTGT
.....
301 CAATGTTTAG ACATCTGACA CGATTCATGA TAGTTCGGTT TCCGGGGTTG
   GTTACAAATC TGTAGACTGT GCTAAGTACT ATCAAGCCAA AGGCCCAAC
.....
351 GTGTTTAGTT TTCGTTTTTC TTTTTTTTTG GAAAGAATGT TTTAGCTCAT
   CACAAATCAA AAGCAAAAAG AAAAAAAAAC CTTTCTTACA AAATCGAGTA
.....
401 TGGTTTCTT TCTTCATCA ATAGTTTGA AAGAATTTGC CCACTTGTTA
   ACCAAAAGAA AGAAGTAAAT TATCAAACT TTCTTAAACG GGTGAACAAT
.....
451 TTACAATCAT ATAAATTAAT ACTTTGATAT AAAATAGAGT TTGAAAGTTT
   AATGTTAGTA TATTTAATT TGAACTATA TTTTATCTCA AACTTTCAAA
.....
501 CCCAGATCCT TTTGATTC TTTGTAAATT TTTTTTCTC CCACATATAC
   GGGTCTAGGA AAAACTAAAG AAACATTTAA AAAAAAGAG GGTGTATATG
.....
                                PstI
                                -----
551 ACACATACAA ACCGATTTTT ATAAGAAAGA GTTATACCCT GCAGCTCGAC
   TGTGTATGTT TGGCTAAAAA TATTCCTTCT CAATATGGGA CGTCGAGCTG
.....
                                PstI      HindIII      AvaI
                                -----
601 CTCGACTGTT TAAACCTGCA GGCATGCAAG CTGCGCCAAA AAGGCCTCGA
   GAGCTGACAA ATTTGGACGT CCGTACGTTT GAACCGGTTT TTCCGGAGCT
.....
                                AvaI
                                -----
651 GGAACATGAC CAACAAGTGT CTCCTCCAAA TGCTCTCCT GTTGTGCTTC
   CCTGTACTG GTTGTTCACA GAGGAGGTTT AACGAGAGGA CAACACGAAG
.....
701 TCCACTACAG CTCTTCCAT GAGCTACAAC TTGCTTGGAT TCCTACAAAG
   AGGTGATGTC GAGAAAGGTA CTCGATGTTG AACGAACCTA AGGATGTTTC
.....
751 AAGCAGCAAT TTTCACTGTC AGAAGCTCCT GTGGCAATTG AATGGGAGGC
   TTCGTCGTTA AAAGTCACAG TCTTCGAGGA CACCGTTAAC TTACCCTCCG
.....
801 TTGAATACTG CCTCAAGGAC AGGATGAACT TTGACATCCC TGAGGAGATT
   AACTTATGAC GGAGTTCCTG TCTTACTTGA AACTGTAGGG ACTCCTCTAA
.....

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FIG. 8. (CONTINUED)

PstI

851 AAGCAGCTGC AGCAGTTCCA GAAGGAGGAC GCCGCATTGA CCATCTATGA
 TTCGTCGACG TCGTCAAGGT CTTCTCTCTG CGGCGTAACT GGTAGATACT

 901 GATGCTCCAG AACATCTTTG CTATTTTCAG ACAAGATTCA TCTAGCACTG
 CTACGAGGTC TTGTAGAAAC GATAAAAGTC TGTTCTAAGT AGATCGTGAC

 951 GCTGGAATGA GACTATTGTT GAGAACCTCC TGGCTAATGT CTATCATCAG
 CGACCTTACT CTGATAACAA CTCTTGGAGG ACCGATTACA GATAGTAGTC

 1001 ATAAACCATC TGAAGACAGT CCTGGAAGAA AACTGGAGA AAGAAGATTT
 TATTTGGTAG ACTTCTGTCA GGACCTTCTT TTTGACCTCT TTCTTCTAAA

 1051 CACCAGGGGA AACTCATGA GCAGTCTGCA CCTGAAAAGA TATTATGGGA
 GTGGTCCCCT TTTGAGTACT CGTCAGACGT GGACTTTTCT ATAATACCCT

 1101 GGATTCTGCA TTACCTGAAG GCCAAGGAGT ACAGTCACTG TGCCTGGACC
 CCTAAGACGT AATGGACTTC CGGTTCTCTA TGTCAGTGAC ACGGACCTGG

 1151 ATAGTCAGAG TGGAAATCCT AAGGAACCTT TACTTCATTA ACAGACTTAC
 TATCAGTCTC ACCTTTAGGA TTCCTTGAAA ATGAAGTAAT TGTCTGAATG

 1201 AGGTTACCTC CGAAACTGAA GATCTCCTAG CCTGTGCCTC TGGGACTGGA
 TCCAATGGAG GCTTTGACTT CTAGAGGATC GGACACGGAG ACCCTGACCT

 1251 CAATTGCTTC AAGCATCTCT CAACCAGCAG ATGCTGTTTA AGTGACTGAT
 GTTAACGAAG TTCGTAAGAA GTTGGTCGTC TACGACAAAT TCACTGACTA

 1301 GGCTAATGTA CTGCATATGA AAGGACACTA GAAGATTTTG AAATTTTAT
 CCGATTACAT GACGTATACT TTCCTGTGAT CTTCTAAAAC TTTAAAAATA

 1351 TAAATTATGA GTTATTTTAA TTTATTTAAA TTTTATTTTG GAAAATAAAT
 ATTTAATACT CAATAAAAAT AAATAAATTT AAAATAAAAC CTTTATTATTA

XmaI

~

SmaI

~

BamHI

AvaI

AvaI

~

1401 TATTTTGGT GCAAAAGTCC CTCGAGGCCT AGCGGCCGCC TAGAGGATCC
 ATAAAAACCA CGTTTTCAGG GAGCTCCGGA TCGCCGGCGG ATCTCCTAGG

XmaI

SmaI

AvaI

1451 CCGGGCGCTA GGCGGCCGCT AGCCCTTTT GGCCAAGCTC GAATTCGAG
 GGCCCGCGAT CCGCCGGCGA TCCGAAAAA CCGGTTTCGAG CTAAAGCTC

XmaI

SmaI

EcoRI

AvaI

ClaI

1501 GAATTCGAGC TCGGTACCCG GGGGATCGAT CCGTCCCCCT TTTCTTTGT
 CTTAAGCTCG AGCCATGGGC CCCCTAGCTA GGCAGGGGA AAAGGAAACA

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FIG. 8. (CONTINUED)

1551 CGATATCATG TAATTAGTTA TGTCACGCTT ACATTCACGC CCTCCCCCA
GCTATAGTAC ATTAATCAAT ACAGTGCAGG TGTAAGTGCG GGAGGGGGT

1601 CATCCGCTCT AACCGAAAAG GAAGGAGTTA GACAACCTGA AGTCTAGGTC
GTAGGCGAGA TTGGCTTTTC CTTCTCAAT CTGTTGGACT TCAGATCCAG

1651 CCTATTTATT TTTTATAGT TATGTTAGTA TTAAGAACGT TATTTATATT
GGATAAATAA AAAAATATCA ATACAATCAT AATCTTGCA ATAAATATAA

1701 TCAAATTTTT CTTTTTTTC TGACAGACG CGTGACGCA TGTAACATTA
AGTTTAAAAA GAAAAAAAG ACATGCTGC GCACATGCGT ACATTGTAAT

1751 TACTGAAAAC CTTGCTTGAG AAGGTTTGG GACGCTCGAA GGCTTTAATT
ATGACTTTTG GAACGAACTC TTCCAAAACC CTGCGAGCTT CCGAAATTAA

1801 TGCAAGCTAG CTTGGCGTAA TCATGGTCAT AGCTGTTTCC TGTGTGAAAT
ACGTTTCGATC GAACCGCATT AGTACCAGTA TCGACAAAGG ACACACTTTA

1851 TGTTATCCGC TCACAATTCC ACACAACATA CGAGCCGGAA GCATAAAGTG
ACAATAGGCG AGTGTTAAGG TGTGTTGTAT GCTCGGCCTT CGTATTTAC

1901 TAAAGCCTGG GGTGCCTAAT GAGTGAGCTA ACTCACATTA ATTGCGTTGC
ATTTCCGACC CCACGGATTA CTCCTCGAT TGAGTGTAAT TAACGCAACG

1951 GCTCACTGCC CGCTTCCAG TCGGAAACC TGTCGTGCCA GAGATCTCTG
CGAGTGACGG GCGAAAGGTC AGCCCTTTGG ACAGCACGGT CTCTAGAGAC

2001 CATTAATGAA TCGGCCAAG CGCGGGGAGA GGCGGTTGC GTATTGGGCG
GTAATTACTT AGCCGGTGC GCGCCCTCT CCGCAAACG CATAACCCGC

2051 CTCTCCGCT TCCTCGCTCA CTGACTCGCT GCGCTCGGTC GTTCGGCTGC
GAGAAGGCGA AGGAGCGAGT GACTGAGCGA CCGAGCCAG CAAGCCGACG

ClaI

2101 GGCGAGCGGT ATCAGATCGA TCTACTCAA AGGCGGTAAT ACGGTTATCC
CCGCTCGCCA TAGTCTAGCT AGAGTGAGTT TCCGCCATTA TGCCAATAGG

2151 ACAGAATCAG GGGATAACGC AGGAAAGAAC ATGTGAGCAA AAGGCCAGCA
TGTCTTAGTC CCCTATTGCG TCTTTCTTG TACTCTGTT TTCCGGTCTG

2201 AAAGGCCAGG AACCGTAAA AGGCCGCGTT GCTGGCGTTT TTCCATAGGC
TTTCCGGTCC TTGGCATTTC TCCGGCGCAA CGACCGCAA AAGGTATCCG

2251 TCCGCCCCC TGACGAGCAT CACAAAATC GACGCTCAAG TCAGAGGTGG
AGGCGGGGG ACTGCTCGTA GTGTTTTAG CTGCGAGTTC AGTCTCCACC

2301 CGAAACCCGA CAGGACTATA AGATACCAG GCGTTTCCC CTGGAAGCTC
GCTTTGGGCT GTCCTGATA TCTATGGTC CGCAAAGGG GACCTTCGAG

2351 CCTCGTGCG TCTCTGTTT CAGCCCTGCC GCTTACCGGA TACCTGTCCG
GGAGCACGCG AGAGGACAAG CTGGGACGG CGAATGGCCT ATGGACAGCG

2401 CCTTTCTCCC TTCGGGAAGC CTGGCGCTTT CTCATAGCTC ACGCTGTAGG
GGAAAGAGGG AAGCCCTTCG CACCGCGAAA GAGTATCGAG TGCGACATCC

ApaLI

2451 TATCTCAGTT CGGTGTAGGT CGTTCGCTCC AAGCTGGGCT GTGTGCACGA
ATAGAGTCAA GCCACATCCA GCAAGCGAGG TTCGACCCGA CACACGTGCT

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FIG. 8. (CONTINUED)

2501 ACCCCCCGTT CAGCCCGACC GCTGCGCCTT ATCCGGTAAC TATCGTCTTG
 TGGGGGGCAA GTCGGGCTGG CGACGCGGAA TAGGCCATTG ATAGCAGAAC

 2551 AGTCCAACCC GGTAAGACAC GACTTATCGC CACTGGCAGC AGCCACTGGT
 TCAGGTTGGG CCATTCTGTG CTGAATAGCG GTGACCGTCG TCGGTGACCA

 2601 AACAGGATTA GCAGAGCGAG GTATGTAGGC GGTGCTACAG AGTTCTTGAA
 TTGTCCTAAT CGTCTCGCTC CATACATCCG CCACGATGTC TCAAGAACTT

 2651 GTGGTGGCCT AACTACGGCT ACACTAGAAG GACAGTATTT GGTATCTGCG
 CACCACCGGA TTGATGCCGA TGTGATCTTC CTGTCATAAA CCATAGACCG

 2701 CTCTGCTGAA GCCAGTTACC TTCGGAAAAA GAGTTGGTAG CTCTTGATCC
 GAGACGACTT CGGTCAATGG AAGCCTTTTT CTCAACCATC GAGAACTAGG

 2751 GGCAAAACAA CCACCGCTGG TAGCGGTGGT TTTTTGTTT GCAAGCAGCA
 CCGTTTGTTT GGTGGCGACC ATCGCCACCA AAAAAACAA CGTTCGTCTG

 2801 GATTACGCGC AGAAAAAAG GATCTCAAGA AGATCCTTTG ATCTTTTCTA
 CTAATGCGCG TCTTTTTTTC CTAGAGTTCT TCTAGGAAAC TAGAAAAGAT

 2851 CGGGGTCTGA CGCTCAGTGG AACGAAAAC CACGTTAAGG GATTTTGGTC
 GCCCCAGACT GCGAGTCACC TTGCTTTTGA GTGCAATTCC CTAAAACCAG

 2901 ATGAGATTAT CAAAAAGGAT CTTACCTAG ATCCTTTTAA ATTAAAAATG
 TACTCTAATA GTTTTTCCTA GAAGTGGATC TAGGAAAATT TAATTTTTAC

 2951 AAGTTTTTAA TCAATCTAA GTATATATGA GTAAACTTGG TCTGACAGTT
 TTCAAAATTT AGTTAGATTT CATATATACT CATTGAACC AGACTGTCAA

 3001 ACCAATGCTT AATCAGTGAG GCACCTATCT CAGCGATCTG TCTATTTCGT
 TGGTTACGAA TTAGTCACTC CGTGGATAGA GTCGCTAGAC AGATAAAGCA

 3051 TCATCCATAG TTGCCTGACT CCCCCTCGTG TAGATAACTA CGATACGGGA
 AGTAGGTATC AACGGACTGA GGGGCAGCAC ATCTATTGAT GCTATGCCCT

 3101 GGGCTTACCA TCTGGCCCCA GTGCTGCAAT GATACCGCGA GACCCACGCT
 CCCGAATGGT AGACCGGGGT CACGACGTTA CTATGGCGCT CTGGGTGCGA

 3151 CACCGGCTCC AGATTTATCA GCAATAAAC AGCCAGCCGG AAGGGCCGAG
 GTGGCCGAGG TCTAAATAGT CGTTATTGG TCGGTGCGCC TTCCCGGCTC

 3201 CGCAGAAGTG GTCCTGCAAC TTTATCCGCC TCCATCCAGT CTATTAATTG
 GCGTCTTCAC CAGGACGTTG AAATAGGCGG AGGTAGGTCA GATAATTAAC

 3251 TTGCCGGGAA GCTAGAGTAA GTAGTTCGCC AGTTAATAGT TTGCGCAACG
 AACGGCCCTT CGATCTCAT CATCAAGCGG TCAATTATCA AACCGGTTGC

 3301 TTGTTGCCAT TGCTACAGGC ATCGTGGTGT CACGCTCGTC GTTTGGTATG
 AACAACGGTA ACGATGTCCG TAGCACCACA GTGCGAGCAG CAAACCATAC

 3351 GCTTCATTCA GCTCCGGTTC CCAACGATCA AGGCAGTTA CATGATCCCC
 CGAAGTAAGT CGAGGCCAAG GGTTGCTAGT TCCGCTCAAT GTACTAGGGG

 3401 CATGTTGTGC AAAAAAGCGG TTAGCTCCTT CGGTCCTCCG ATCGTTGTCA
 GTACAACACG TTTTTCGCC AATCGAGGAA GCCAGGAGGC TAGCAACAGT

 3451 GAAGTAAGTT GGCCGAGTG TTATCACTCA TGGTTATGGC AGCACTGCAT
 CTTCAATCAA CCGCGGTCAC AATAGTGAGT ACCAATACCG TCGTGACGTA

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FIG. 8. (CONTINUED)

3501 AATTCTCTTA CTGTCATGCC ATCCGTAAGA TGCTTTTCTG TGACTGGTGA
TTAAGAGAAT GACAGTACGG TAGGCATTCT ACGAAAAGAC ACTGACCACT

3551 GTACTCAACC AAGTCATTCT GAGAATAGTG TATGCGGCGA CCGAGTTGCT
CATGAGTTGG TTCAGTAAGA CTCTTATCAC ATACGCCGCT GGCTCAACGA

3601 CTTGCCCGCG GTCAATACGG GATAATACCG CGCCACATAG CAGAACTTTA
GAACGGGCGC CAGTTATGCC CTATTATGGC GCGGTGTATC GTCTTGAAAT

3651 AAAGTGCTCA TCATTGGAAA ACGTTCTTCG GGGCGAAAAC TCTCAAGGAT
TTTCACGAGT AGTAACCTTT TGCAAGAAGC CCCGCTTTTG AGAGTTCCTA

ApaLI

3701 CTTACCGCTG TTGAGATCCA GTTCGATGTA ACCCACTCGT GCACCCAACCT
GAATGGCGAC AACTCTAGGT CAAGCTACAT TGGGTGAGCA CGTGGGTTGA

3751 GATCTTCAGC ATCTTTTACT TTCACCAGCG TTCTTGGGTG AGCAAAAACA
CTAGAAGTCG TAGAAAATGA AAGTGGTCCG AAAGACCCAC TCGTTTTTGT

3801 GGAAGGCAAA ATGCCGCAAA AAAGGGAATA AGGGCGACAC GGAAATGTTG
CCTCCGTTT TACGGCGTTT TTTCCCTTAT TCCCCTGTG CCTTTACAAC

3851 AATACTCATA CTCTTCCTTT TTCAATATTA TTGAAGCATT TATCAGGGTT
TTATGAGTAT GAGAAGGAAA AAGTTATAAT AACTTCGTAA ATAGTCCCAA

3901 ATTGTCTCAT GAGCGGATAC ATATTTGAAT GTATTTAGAA AAATAAACAA
TAACAGAGTA CTCGCCTATG TATAAACTTA CATAAATCTT TTTATTTGTT

3951 ATAGGGGTTT CGCGCACATT TCCCCGAAAA GTGCCACCTG ACGTCTAAGA
TATCCCAAG GCGCGTGTA AGGGGCTTTT CACGGTGGAC TGCAGATTCT

4001 AACCATTATT ATCATGACAT TAACCTATAA AAATAGGCGT ATCAGGAGGC
TTGGTAATAA TAGTACTGTA ATTGGATATT TTTATCCGCA TAGTGCTCCG

4051 CCTTTCGTCT CGCGCGTTTC GGTGATGACG GTGAAAACCT CTGACACATG
GGAAAGCAGA GCGCGCAAAG CCACTACTGC CACTTTTGGA GACTGTGTAC

4101 CAGCTCCCGG AGACGGTCAC AGCTTGCTCG TAAGCGGATG CCGGGAGCAG
GTCGAGGGCC TCTGCCAGTG TCGAACAGAC ATTTCGCCTAC GGCCCTCGTC

4151 ACAAGCCCGT CAGGGCGCGT CAGCGGGTGT TGGCGGGTGT CGGGGCTGGC
TGTTCCGGCA GTCCCGCGCA GTCGCCACA ACCGCCACA GCCCCGACCG

ApaLI

4201 TTAACATATG GGCATCAGAG CAGATTGTAC TGAGAGTGCA CCATATCGAC
AATTGATACG CCGTAGTCTC GTCTAACATG ACTCTCACGT GGTATAGCTG

4251 GCTCTCCCTT ATGCGACTCC TGCATTAGGA AGCAGCCCAG TAGTAGGTTG
CGAGAGGGAA TACGCTGAGG ACGTAATCCT TCGTCGGGTC ATCATCCAAC

4301 AGGCCGTTGA GCACCGCCGC CCAAGGAAT GGTGCATGCA AGGAGATGGC
TCCGGCAACT CGTGGCGGCG GCGTTCCTTA CCACGTACGT TCCTCTACCG

4351 GCCCAACAGT CCCCCGGCCA CGGGGCTTGC CACCATACCC ACGCCGAAAC
CGGGTTGTCA GGGGGCCGGT GCCCCGACG GTGGTATGGG TGCGGCTTTG

4401 AAGCACTAAT AGGAATTGAT TTGGATGGTA TAAACGAAA CAAAAAAG
TTCGTGATTA TCCTTAAC TAACCTACCAT ATTTGCCTTT GTTTTTTTTC

4451 AGCTGGTACT ACTTCTTTA AAATTATTTT ATTATTGAT TTTATTTAAT
TCGACCATGA TGAAAGAAAT TTTAATAAAA TAATAAACTA AAATAAATTA

4501 AGTATATATT ATATTTTGAA CGTAGATTAT TTTGTTGAAA GTTGCTGTAG
TCATATATAA TATAAACTT GCATCTAATA AAACAACTTT CAACGACATC

4551 TGCCATTGAT TCGTAACACT AATTCTGTAT TAGTCATTCC TCTTGTTTGA
ACGGTAACATA AGCATTGTGA TTAAGACATA ATCAGTAAGG AGAACAACT

4601 TAGTATCCAA AAAAACGGCT ATTTTTTTGC AATCTTATTT CCTGCATATT
ATCATAGGTT TTTTGGCCGA TAAAAAACG TTAGAATAAA GGACGTATAA

4651 ATACAGATAA CATAATGAAA GAAAAAATCT TTTTTTTTGT TCTTCAATGA
TATGTCTATT GTATTACTTT CTTTTTTTGA AAAAAAACA AGAAGTTACT

4701 TGATTTCAAC CATTCTTTTA AACATTGATC AATTCCTGAG CAACAACCCC
ACTAAAGTGG GTAAGAAAT TTGTAAGTAG TTAAGGACTC GTTGTGTTGGG

4751 ATACACACTG GTTATATAC CGCCCTTTT ACAGTTGAAG AAAGAAATAG
TATGTGTGAC CAAATATATG GCGGGGAAAA TGTCAACTTC TTTCTTTATC

4801 AAATAGAAAT AGCAAACAAA AGATATGACA GTCAACACTA AGACCTATAG
TTTATCTTTA TCGTTTGTTT TCTATACTGT CAGTTGTGAT TCTGGATATC

4851 TGAGAGAGCA GAAACTCATG CCTCACCAGT AGCACAGCGA TTATTTTCGAT
ACTCTCTCGT CTTTGAGTAC GGAGTGGTCA TCGTGTGCGT AATAAAGCTA

4901 TAATGGAAC T GAAGAAAACC AATTTATGTG CATCAATTGA CGTTGATACC
ATTACCTTGA CTTCTTTTGG TTAAATACAC GTAGTTAACT GCAACTATGG

AvaI

4951 ACTAAGGAGT TCCTCGAGTT AATTGATAAA TTAGGTCCTT ATGTATGCTT
TGATTCTCA AGGAGCTCAA TTAATAATTT AATCCAGGAA TACATACGAA

5001 AATCAAGACT CATATTGATA TAATCAATGA TTTTTCCTAT GAATCCACTA
TTAGTTCTGA GTATAACTAT ATTAGTTACT AAAAAGGATA CTTAGGTGAT

5051 TTGAACCATT ATTAGAACTT TCACGTAAAC ATCAATTAT GATTTTTGAA
AACTTGGTAA TAATCTTGAA AGTGCATTTG TAGTTAAATA CTA AAAA ACTT

5101 GATAGAAAT TTGCTGATAT TGGTAATACC GTAAAGAAAC AATATATTGG
CTATCTTTTA AACGACTATA ACCATTATGG CATTTCCTTG TTATATAACC

5151 TGGAGTTTAT AAAATTAGTA GTTGGGCAGA TATTACCAAT GCTCATGGTG
ACCTCAAATA TTTTAATCAT CAACCCGTCT ATAATGGTTA CGAGTACCAC

5201 TCACTGGGAA TGGAGTGGTT GAAGGATTAA AACAGGGAGC TAAAGAAACC
AGTGACCCTT ACCTACCAAG CTCCTAATT TTGTCCCTCG ATTTCTTTGG

5251 ACCACCAACC AAGAGCCAAG AAGGTTATTG ATGTTAGCTG AATTATCATC
TGGTGGTTGG TTCTCGGTTT TCCAATAAC TACAATCGAC TTAATAGTAG

5301 AGTGGGATCA TTAGCATATG GAGAATATTC TCAAAAAACT GTTGAAATTG
TCACCCTAGT AATCGTATAC CCTTATAAG AGTTTTTTGA CAACTTTAAC

5351 CTAATCCGA TAAGGAATTT GTATTGGAT TTATTGCCCA ACGTGATATG
GATTTAGGCT ATTCCTTAAAG CATAACCTA AATAACGGGT TGCCTATAC

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FIG. 8. (CONTINUED)

5401 GGTGGCCAAG AAGAAGGATT TGATTGGCTT ATTATGACAC CTGGAGTTGG
CCACCGGTTT TTCTTCCTAA ACTAACCGAA TAATACTGTG GACCTCAACC
.....

5451 ATTAGATGAT AAAGGTGATG GATTAGGACA ACAATATAGA ACTGTTGATG
TAATCTACTA TTTCCACTAC CTAATCCTGT TGTATATATCT TGACAACTAC
.....

5501 AAGTTGTTAG CACTGGAACCT GATATTATCA TTGTTGGTAG AGGATTGTTT
TTCAACAATC GTGACCTTGA CTATAATAGT AACAACCATC TCCTAACAAA
.....

5551 GGTAAAGGAA GAGATCCAGA TATTGAAGGT AAAAGGTATA GAAATGCTGG
CCATTTCTCT CTCTAGGTCT ATAACCTCCA TTTTCCATAT CTTTACGACC
.....

5601 TTGGAATGCT TATTTGAAAA AGACTGGCCA ATTATAAATG TGAAGGGGGA
AACCTTACGA ATAAACTTTT TCTGACCGGT TAATATTTTAC ACTTCCCCCT
.....

5651 GATTTTCACT TTATTAGATT TGTATATATG TAGAATAAAT AAATAAATAA
CTAAAAGTGA AATAATCTAA ACATATATAC ATCTTATTTA TTTATTTATT
.....

5701 GTTAAATAAA TAATTAAATA AGGGTGGTAA TTATTACTAT TTACAATCAA
CAATTTATTT ATTAATTTAT TCCACCATT AATAATGATA AATGTTAGTT
.....

5751 AGGTGGTCCT TCTAGCTGTA ATCCGGGCAG CGCAACGGAA CATTTCATCAG
TCCACCAGGA AGATCGACAT TAGGCCCGTC GCGTTGCCTT GTAAGTAGTC
.....

5801 TGTA AAAATG GAATCAATAA AGCCCTGCGC TCATGAGCCC GAAGTGGCGA
ACATTTTAC CTTAGTTATT TCGGGACGCG AGTACTCGGG CTTACCCGCT
.....

5851 GCCCGATCTT CCCCATCGGT GATGTCGGCG ATATAGGCGC CAGCAACCGC
CGGGCTAGAA GGGGTAGCCA CTACAGCCGC TATATCCGCG GTCGTTGGCG
.....

5901 ACCTGTGGCG CCGCAGCGCG CAGGGTCAGC CTGAATACGC GTTTAATGAC
TGGACACCGC GCGTCGCGC GTCCCAGTCG GACTTATGCG CAAATTACTG
.....

5951 CAGCACAGTC GTGATGGCAA GGTCAGAATA GCCCAAGTCG GCCGAGGGGC
GTCGTGTCAG CACTACCGTT CCAGTCTTAT CGGGTTCAGC CGGCTCCCCG
.....

6001 CTGTACAGTG AGGGAAGATC TGATATTGAC GAAGAGGAAC CAATGTAACG
GACATGTCAC TCCCTTCTAG ACTATAACTG CTTCTCCTTG GTTACATTGC
.....

6051 TTACACTGAA GAAAACACAC AATAAACGGG AAGAAACGGT GTAAAAGTGT
AATGTGACTT CTTTGTGTG TTATTTGCCA CATTTCACA
.....

6101 GAAAATAATT TTTGAATATC ATTTCCCTTG GTTTAATTCC AAACGAAACG
CTTTTATTAA AAACCTATAG TAAAGGGAAC CAAATTAAGG TTTGCTTTGC
.....

EcoRI

6151 TGTTTTTTTT AGAGAATGGG AATCTTATT GGATGTCTAG ATTGTTTGTT
ACAAAAAAA TCTCTTACCC TTAAGAATAA CCTACAGATC TAACAAACAA
.....

ApaLI

6201 TACTCCAGAC TGTGCACAAA AACGTTTGGA TGGATGATCA GAAGATATTT
ATGAGGTCTG ACACGTGTTT TTGCAACCT ACCTACTAGT CTTCTATAAA
.....

6251 TTAGGCTTAG CTCTAAATAT AAGAAATGAT GCTTGAAAA CCAGACAGAA
AATCCGAATC GAGATTTATA TTCTTACTA CGAACTTTT GGTCTGTCTT
.....

6301 ATTGAGTTTC AAAAATTGGT AATGTGAGGT ATTAGTCAAC TAACCAATA
TAACCTAAAG TTTTAAACCA TTAACCTCCA TAATCAGTTG ATTGGTTTAT
.....

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FIG. 8. (CONTINUED)

6351 ACAATGCAAA CCGGTTGATA CATTTCATTT TGAAAATAAT GAAACTGGAA
TGTTACGTTT GGCCAACTAT GTAAAGTAAA ACTTTTATTA CTTTGACCTT

6401 TTGGATGACC AGCACACAAA CACATAAAGT AATTATGGGA ATTAGAAGCG
AACCTACTGG TCGTGTGTTT GTGTATTTCA TTAATACCCT TAATCTTCGC

6451 AACATAGAGG AGTACTTGGC CACGAACAGA ATACAAGTGG GAACACTATT
TTGTATCTCC TCATGAACCG GTGCTTGTCT TATGTTCCACC CTTGTGATAA

6501 TTCTCCATTG TTTTAGTTCT GTTTTTTTGT CAGCCTAGTT TTGTGCTATG
AAGAGGTAAC AAAATCAAGA CAAAAAACA GTCGGATCAA AACACGATAC

HindIII

6551 TGTAAGAAAT ATTGCCAAGA AAAAAAGCTT GTTTTGTGGC CAGTGTCCGA
ACATTTTTTA TAACGGTTCT TTTTTCGAA CAAACACCG GTCACAGGCT

6601 AAAAAATTTT GGGGAATCTT CGGATTAATT TATGTTTTCA
TTTTTTAAAA CCCCTTAGAA GCCTAATTAA ATACAAAAGT

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FIG. 9.

ATGTATGTTTATAAGAGAGATGGCCGTAAAGAGCCAGTACGTTTCGACAAAAT
CACTGCCAGAGTTCAAAGATTATGTTA
CGGTTTGAATCCAAACCACGTTGAACCAGTTGCTATTACCCAAAAAGTTATATC
AGGTGTTTACCAGGGGGTTACTACTA
TTGAGTTGGACAACCTGGCTGCAGAAATTGCTGCTACAATGACAACAATTCAC
CCAGATTACGCTGTCTTAGCCGCTAGA
ATTGCCGTATCAAATTTACATAAGCAAACCACCAAACAGTATTCCAAAGTGTC
TAAGGATTTATATGAATACATTAATCC
TAAGACTGGGTTACACTCTCCTATGATTTCCAAGGAAACCTACGACATCATTAT
GGAACACGAAGATGAATTAACCTCAG
CCATTGTTTACGACAGAGATTTTAACTACAATTATTTTGGGTTCAAGACTTTGG
AAAGATCATATTTGTTACGTATCAAC
GGTAAGGTTGCTGAAAGACCACAACATTTGATCATGAGGGTTGCTGTCCGGTAT
TCACGGTAATGATATACCAAGGGTCAT
TGAAACCTATAACTTGATGTCTCAAAGATTCTTCACCCATGGTTCTCCTTGTTTA
TTTAACGCTGGTACACCAAGACCAC
AAATGTCCTCATGTTTCTTGCTTGCTATGAAGGATGATTCTATTGAAGGTATTT
ACGACACTTTGAAATCGTGTGCTTTG
ATCTCAAAAAGTGCTGGAGGAATCGGTTTACACATCCACAACATTCGTTCTACC
GGTGCTTACATTGCTGGTACCAATGG
TACTTCTAATGGTATTATTCCAATGGTAAGAGTATTCAATAACACTGCACGTTA
TGTCGACCAAGGTGGTAACAAGAGAC
CTGGTGCTTTGCCTTGTAAGTATAGAACCATGGCACAGTGACATTTTTGATTTC
TTGATATTAGAAAGAATCACGGTAAA
GAAGAAATCAGAGCCAGAGATTTGTTCCAGCTTTGTGGATTCCAGATTTGTTC
ATGAAAAGAGTTGAACAAAATGGTGA
CTGGACTTTATTCTCACCAAATGAGGCCCCAGGCTTGGCTGATGTTTATGGTGA
CGAATTCGAAGAATTATACACCAAAT
ACGAAAAAGAAAACCGTGGTAGACAGACCATCAAAGCTCAAAAATTGTGGTA
TGCTATTTTGGGAGCCCCAACTGAAACA
GGTACCCCATTTATGTTATATAAAGATTTCATGTAACAACAAATCCAACCAAAA
GAACTTGGGTATTATCAAATCTTCAA
CTTGTTGTTGTGAAATTGTTGAATATTCTGCTCCAGATGAAGTTGCTGTTTGTA
CTTGGCTTCCATTGCCTTGCCATCAT
TTGTTGAAAATGATGAAAAAGTACTTGGTACAACCTTTGACAAATTACATCAG
GTCATAAGGTTGTCACCCGTAACCTTG
AACAGAGTTATTGACCGTAACCATTACCCAGTCCCAGAAGCTGAAAGATCAAA
CATGAGACACAGACCAATTGCTTTGGG
TGTTCAAGGTTTGGCTGATGCCTTTATGGAATTGAGATTACCATTTGACTCTCA
AGAAGCTAGAGAATTGAACATTCAAA

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FIG. 9. (CONTINUED)

TTTTTGAGACTATCTACCATGCTGCTGTTGAAGCTTCAATTGAATTGGCTAAAG
AAGAAGGTGCCTACGAAACCTATCCA
GGTTCTCCAGCCTCTCAAGGTTTATTACAATTTGATTTGTGGAACAGAAAACCA
ACTGAATTATGGGATTGGGATACATT
AAAACAAGATTTGGCCAAACATGGTATGAGAACTCCTTGTTGGTTGCACCAA
TGCCTACTGCTTCCACATCACAATTT
TGGGTAACAATGAATGTTTTGAACCATACACTTCTAACATTTACTCTAGAAGAG
TATTAGCTGGAGAATTCCAAATTGTC
AATCCATATTTATTGAAGGACTTGGTTGATTTGGGTGTCTGGAACGACGCTATG
AAAAGTAGTATTATTGCTAACAAATGG
TTCTATCCAAGCCTTACCAAACATCCCTGATGAAATCAAGGCATTGTACAAAA
CTGTCTGGGAAATCTCACAAAAACATA
TTATCGACATGGCTGCTGATAGAGCAGCATTTATTGATCAATCTCAATCATTA
ACATTCACATCAAAGATCCAACAATG
GGTAAATTAACCAGTATGCACTTCTACGGTTGGAAGAAAGGTTTAAAGACTGG
TATGTACTACTTAAGAACACAAGCTGC
CAGTGCTGCTATTCAATTTACCATTGATCAAAAGATTGCTGAGACTGCCGGTCA
TACGGTTGCAAACCTTGGACAAATTAA

ACATTAAGAAATATGTTAACAAAGGAAGAGTTGAGAGTGAGAATACCAGTGAT
GCTCCATACAAGTCACCATCAACCGAA
CCAACCTCATTAGAAAGTTGAGTTGCTGATTTGAAAATAAAAGATGAAGGTGA
AAAGCCAGCTGAAGACAAAACCATTTGA
AGAACTCGAAAATGACATTTATAGTGCCAAAGTTATCGCATGTGCTATTGATA
ATCCAGAATCTTGTACAATGTGTTCTG
GT

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FIG. 10.

ATAGAAGCTGTTTGATATACAACTATCTCAGTCCCAATTGTGACTTGAATAAATAAATACCTATCACCTAGTAATCTTT
ATCTTAACGTAACTCTGCAAGGCACAAATCAATGTATAAAGCATAAAGATAAANTCTTGGTGAGGTTTAAAGTTCAATAAT
TATAATGACACAAATTACTAAAGGATGGTATCAACAAATTAAGGCTAGGTAGAACCATAGTGCTGTTCCGGAGTT
CGGTAGTTTGGGAAGTTGGGAAGTTGGATAGTTTGAGAAAGGTTCGTCGCTGATTCTAAATTAACAGAGAACGATAT
AATGTACAAATAAACATTTCAGAAATTTAAACAAACCTTTATATATATATAATTAATGCTCTTGTCTCAATCAACTTGCCATTGC
TGTGATGATGCTTTCCTGTTAAATATACCTTTAAGAACCAAGATTCACTATCTCAACTAATAATTAACCTTATACCTTTT
GTTTGACATTCCATATGACACAAAGAATGTGAATATTTTACCTCAAGGGATTCTACTCATTCCTCAACAACA
CACATTCTTTGTATCACCAATACCTTTTGTAAACAGAGGAACAAATAATTGACACGCCATGTCAATTAACCTATAGCACTA
TCACTACAAATCAAGGATTTACAAATAGTGGGAATGTCAAAATCATGTATATTATTACACATTAACACATATTTATTTTCA
GGTACATAAATACTCAATAATCTAAATTTCAAAATGGTACTGTACCTTAAACTTTCCTTCTCATGTCTAGTTGAATATTAT
ACTTGCTAATGTCAAAAAATCAATGCTTCACACAAATCCAGGTTGT

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FIG. 11.

GCAAGATCTAACTCCAGTTTITGGTGTAAATGTTACACAGCAACAAATATATAATCGAAAGCCCCCAATATTCT
CTTCTACAAATTACGAAAAATGTTTCACATGATGAAAGCTTTATCTATACTATTTCTCCTCCAACTCTAGCAGTGAG
AATGATACTGATATCTCCTATAGGATACAGTTATCTATTATAGTATAATAATATCATGGAGATAAATATATTAA
TCGATGGAGTTAACGAGAAACAAATACACCCCATTTTCAGCAAAATGAGACATTTTCACAGAAATAAACAAGAAAG
ACAATTACTCCATTCAATATAATCCCAATATAAATAATACAAAGAACAAACGTACTAACAAATAACATCAATTTCA
CTTTGAATACTTTACATCTCACTTCTAAGATTAAATATAGCGATGCATATTCATCAGAAATTTAGTGTATACAATA
TGCAGGTGATTATGAGCCAGTGAACAAATTCCTTACTAAATACTAGAGTTGTTTATATACAGTATTTTGTCTAACC
CTGTCTTAACGTATACAGATAAGATTGTAAATCGTTAGANTAACAAAGAGGTGTGGTTGTGGACTTGTGGTGGTGG
CAAAATTGAAATGATATAATTGTTATCTCAAGTATAGCAATACAAAGGCAAAAGGCTGCACAAACAAGAACTTGGATT
GTCCGAATTCTCTCACCCCTTTCAGAAATGTCCTCGTGTATGTGATCAAT

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FIG. 12.

CCCCGTTAACCACTTCTAGGGTATACCATTTCATCTGACTGAATAACTGGTTAG
TCGATTIGTTGTTGAAGAAAAGTGAC
CACCTAGTTTTTTCTGCCAACATTTTTTGCGATGAGCCGTCGACGCGTTGTCTTT
TTCTACCCACGTTTAACAATCTTG
CCAGTCAATTCCCTAGCCAAATAAACTTTAGACTCACAACCTCTAACACTGACTC
GTGCCCCCCTGTTAAACTCTAAATT
ACTTCACAGAGCCTTTACTACCTTAAATTTARGRTTWTSKAKKGTTTCTGTTTTT
TTGCAAATCACCCCTGACTYGTTTTT
TTTTCAGCCAGGTTTTTCGTTAAAATCTGACCAAAAAATTTACRACTCCTATWT
TTAAAACCTCYAAAWWACAATTTAAAC
TCAATTCAGACAAGTCCTTCTGCTCATTCTGAGTCTTCTATTGTCTTTTGACT
TTTTGTGTGTGACTATTTTCATGAT
CACCCCGTTTCTTGCATTTTTTTCAGTCAACTTTTTCTCAAAATCAAGCCAAAAA
AACACACCTTTAACTACCTATACAA
CGCAAACCTATTCAAAACA

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FIG. 13.

ATGACTACTTCCAAGGAACTTTCTTTTCACTTCAGAATCCGTTGGTGAAGGT
CACCCAGATAAGATTTGTGACCAAGT
CTCCGATGCCATTTTAGATGCTTGTTTAGCTGTTGATCCATTGTCAAAAGTTGCT
TGTGAAACTGCTGCCAAAACCGGTA
TGATTATGGTTTTTGGTGAAATTACCACTAAAGCTCAATTGGATTATCAAAAAA
TCATTAGAGACACCATTAACACATT
GGTTACGACGATTCTGAAAAAGGTTTTGATTACAAGACTTGTAACGTCTTGGTT
GCAATTGAACAACAATCTCCAGATAT
TGCTCAAGGTTTACATTACGAAAAAGCTTTGGAAGAGTTGGGTGCTGGTGATC
AAGGTATTATGTTTGGTTATGCCACCG
ATGAAACCGATGAAAAATTGCCATTGACCATTTTATTGGCCACAAATTGAAT
GCTGCCTTGGCTTCTGCCAGAAGATCA
GGTTCCTTGCCATGGTTGAGACCAGATACCAAAACCCAAGTCACCATCGAGTA
TGAAAAAGATGGTGGTGCA GTTATCCC
AAAAAGAGTCGACACAATTGTTATTTCCACTCAACATGCCGAAGAAATCACCA
CCGAAAATTTGAGAAAAGAAATTATTG
AACATATCATCAAGCAAGTCATCCCAGAACATTTATTAGACGACAAAACCTATC
TACCACATTGAGCCATCAGGCAGATT
GTCATTGGTGGTCCCCAAGGTGATGCTGGTTTGACTGGTAGAAAGATCATTGTT
GACACCTATGGTGGTTGGGGTGCA
TGGTGGTGGTGCCTTCTCAGGCAAGGATTTCTCCAAAGTTGATAGGTCTGCTGC
TTATGCCGCTCGGTGGGTGCTAAGT
CGTTGGTGACCGCCGGATTGGCCAAAAGGGCCTTGGTGCAGTTCTCCTATGCTA
TTGGGGTTGCTGAACCCACCAGCATT
TATATAGACACCTATGGGACATCTAAATTGAGCACCGAAGCCCTTGTAGAAAT
TATCAAGAATAATTTTGACTTACGCCC
TGGCGTAATTGTAAAAGAATTAGATTTGGCTCGTCCTATTTATTTTAAAACCGC
TTCTTACGGACATTTTACTAACCAAG
AAAATTCTTGGGAACAACCAAAAAAATTAAAATTT

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FIG. 14.

1 MYVYKEDGRK EFVRFCKITA RVQRLCYGLN PNHVEPVAIT QKVISGVYQG
 31 VOTIELDNLA AELIATMTTI HPDYAVLAAR IAVSNLHKQT TKQYSKVSRO
 101 LYEYINPKTC LHSFMISKET YDIIMEHEDE LNSAIVYDRD FMYNYFGFKT
 151 LERSYLLRIN GTVAERPQEL IMPVAVGEGH NDIPRVIETY NLMSQRFFTH
 201 GSPCLFNAGT FRPMSSCFL LAMKDDSGEG IYDTLKSCAL ISKSAGGIGL
 251 HINIRSTGA YIAGTNGTSH GIIFMVRVFN NTARYVDQGG NKRPGAFALY
 301 LEFWHSDIFD FIDIRKXHGK EDIRARDLFP ALWIPDLFMK RVZQNGELWL
 351 FSPNEAPGLA DVYGDCEFEEL YTRYEKENRG RQTIKAQKLW YAILGAYTET
 401 GTTFMLYKDS CCKXSNQKNL GIIKSSNLCC EIVEYSAPDE VAVCNLASIA
 451 LPSFVENDEK STWNTFKLH QVTKVVTNRL NRVIDRNHYP VFEAERSKMR
 501 HRPALGVQG LACAFMEIRL PFDSQEAREL NIQIFETIVH AA/VEASTELA
 551 KEEGAYETYP GSPASQGLLQ FDLWNRKFTB LWDWDTLXQD LAKHGMRNSL
 601 LVAPMPTAST SQILGNNECF SPYTSNIYSE RVLAGEFGIV NPYLLKDLVD
 651 LGVANDABES SIIANGSIQ ALPNIPDEIK ALYKTVWEIS QKHIIDMAAD
 701 RAAFIDQSQS LNNIXDPTX GKLTSMHFGY WKXGLKTGMY YLRTQAASAA
 751 IQFTIDCKIA ETAGHTVAIL EKLNIKKYVN KGRVESENTS DAPYKSPSTE
 801 PTSLESSVAC LKXDEGEKF AEDKTIEELE NDIYSAXVIA CAIENPESCT
 851 MCGG

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FIG. 15.

1 MITSKETFLF TSSEVGZOHF DKICQVSDA ILDAVLAVDF LSKVACETAA
51 KIGMIN/EGE ITTKAQLDYQ KEEFD/TKHI GYDSEKGFQ YATCNVLVAI
101 EQQSPDLAQG LHYEZALEEL GAGDQGINFG YATDETDEKL PETILLAKKL
151 NAALASARNS GSLPWLRPCT KTQVTIEYEK DGGAVIPKRV DTIVISTQHA
201 EEIPTENLRY EIEHNIKQV IPEHLLDOKT IYKIQPSGRF VIOGPGGEAG
251 LTGRKIIVTF YGGWJANGCG AFSOKDFSKV DRSAAYAARN VAKSLVTAGL
301 AKRALVQFSY AGWREPTSI YIDTYGTSKL STEALVEIHK NNFDLRPGVI
351 VXEZDLARPI YKTCASYGHF TNQENSWEQP KKLKF

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FIG. 16.

RH170498 AF101-AF150 (16 hours
glucose/maltose vs galactose/maltose
AF110

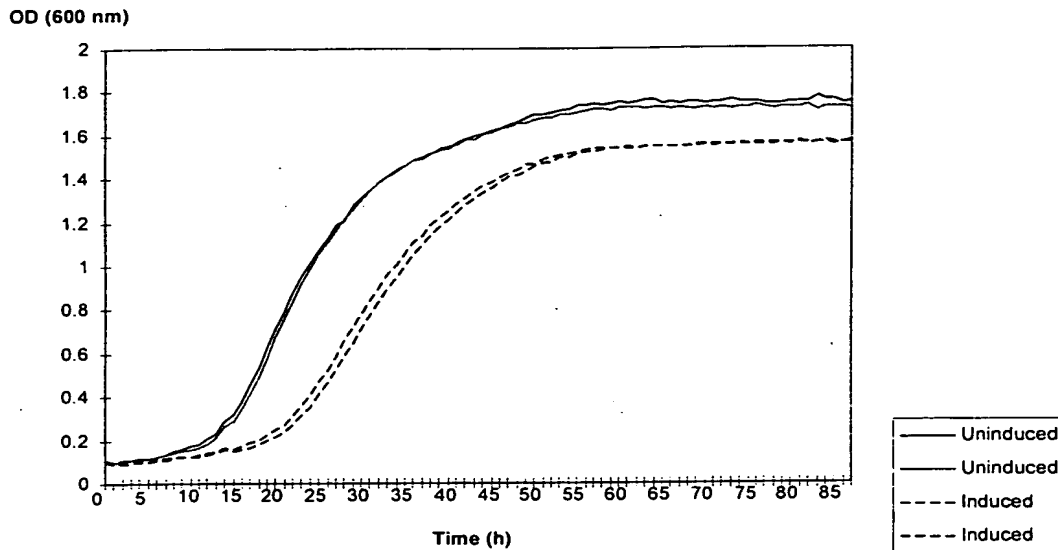
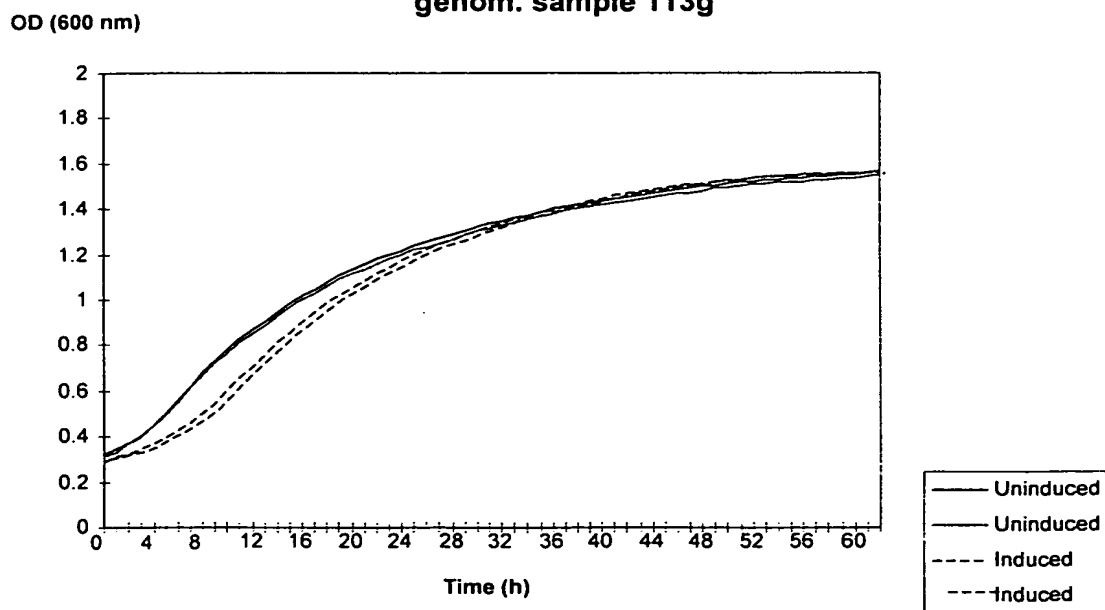


FIG. 17.

C. albicans library screening experiment 28/11/97
glucose/maltose vs galactose/maltose
genom. sample 113g



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FIG. 18.

RH170498 AF101-AF150 (16 hours induction).
glucose/maltose vs galactose/maltose
AF117

OD (600 nm)

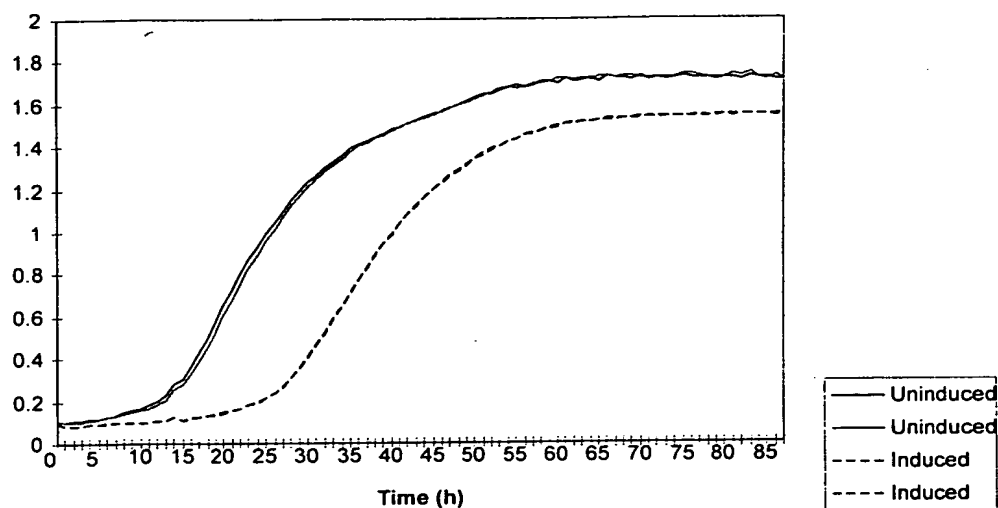
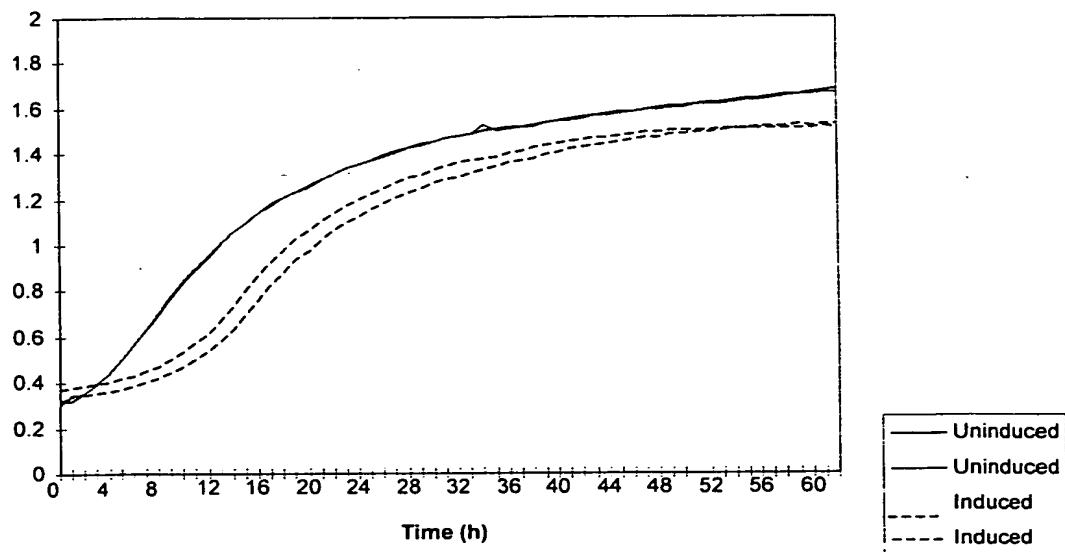


FIG. 19.

C. albicans library screening experiment 28/11/97
glucose/maltose vs galactose/maltose
genom. sample 135g

OD (600 nm)



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FIG. 20.

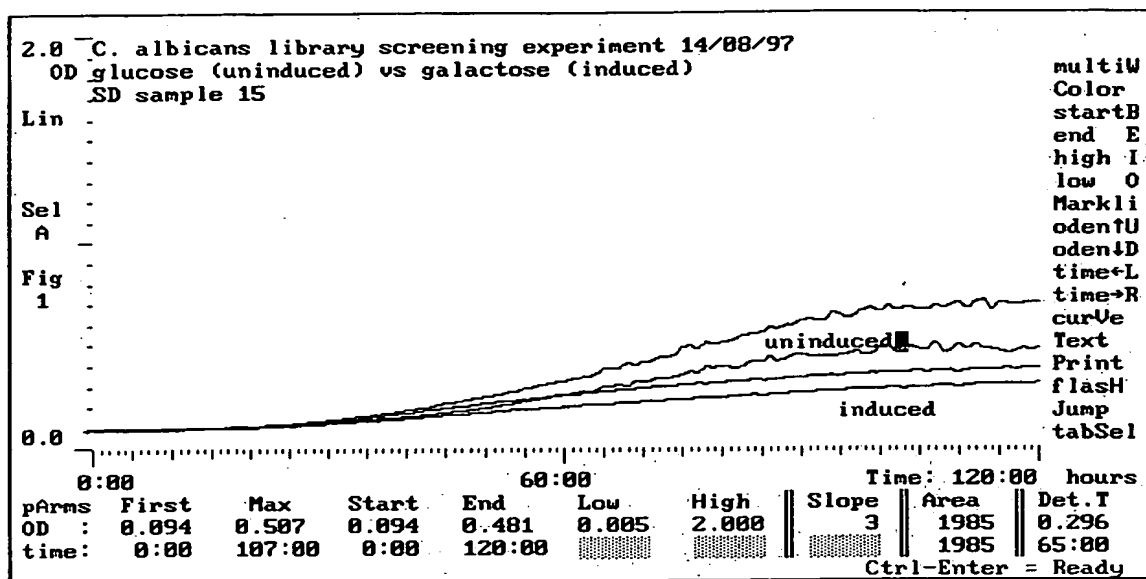
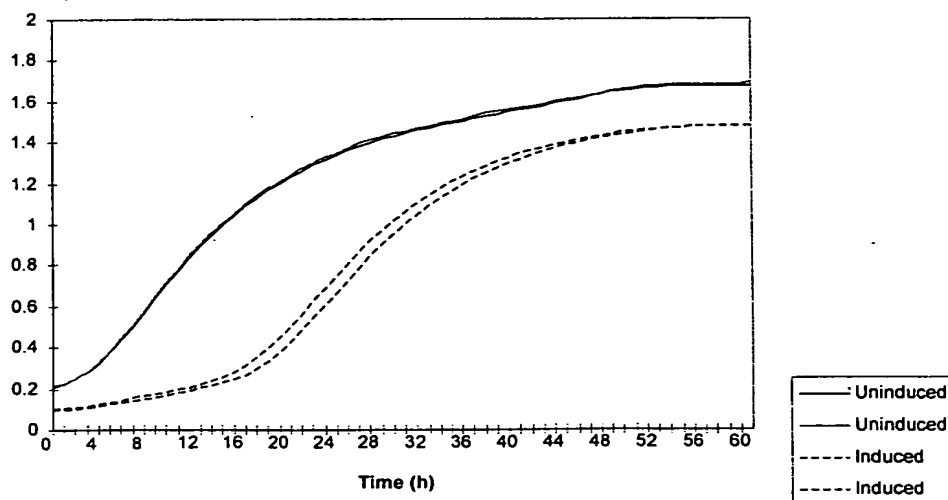


FIG. 21.

C. albicans library screening experiment 31/03/98
 glucose/maltose vs galactose/maltose
 sample 17CP

OD (600 nm)



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FIG. 22.

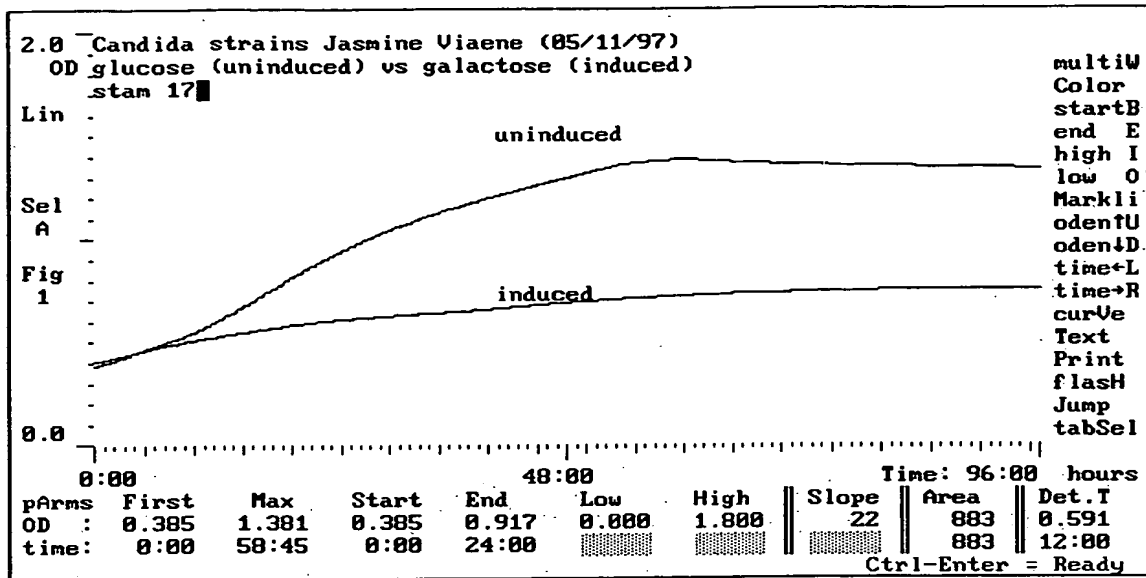
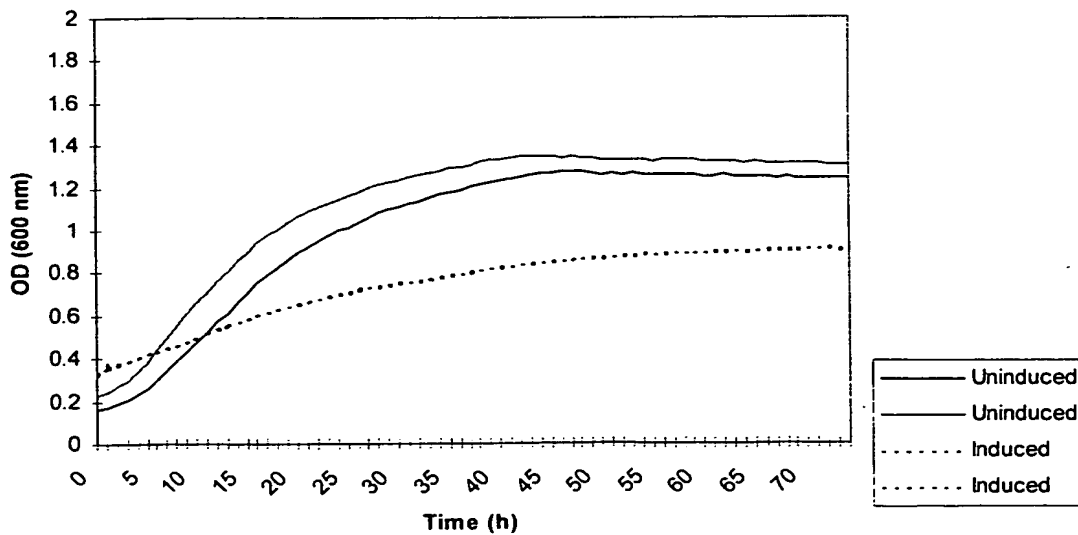


FIG. 23.

C. albicans library screening experiment 15/12/97
glucose vs galactose
genom. sample 190g



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FIG. 24.

C. albicans library screening experiment 15/12/97
glucose vs galactose
genom. sample 207g

OD (600 nm)

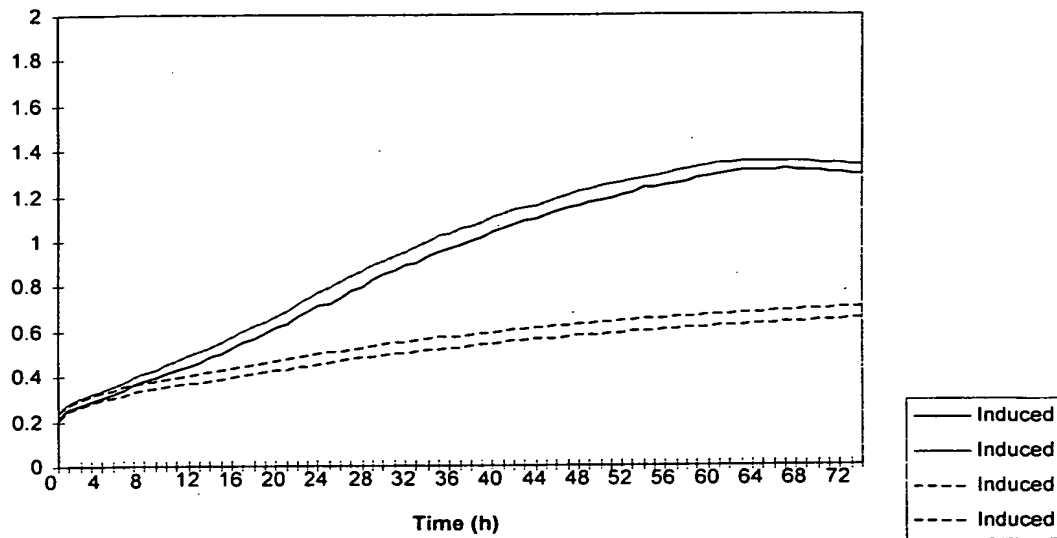
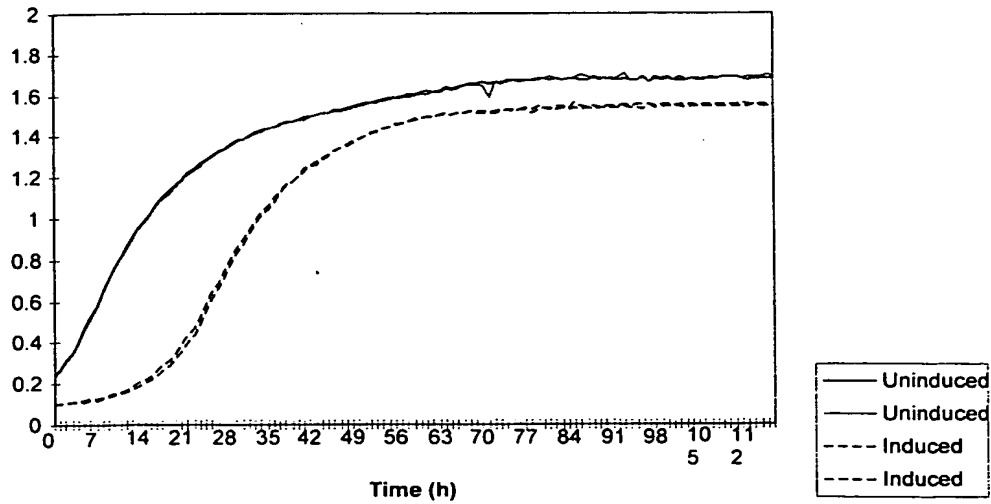


FIG. 25.

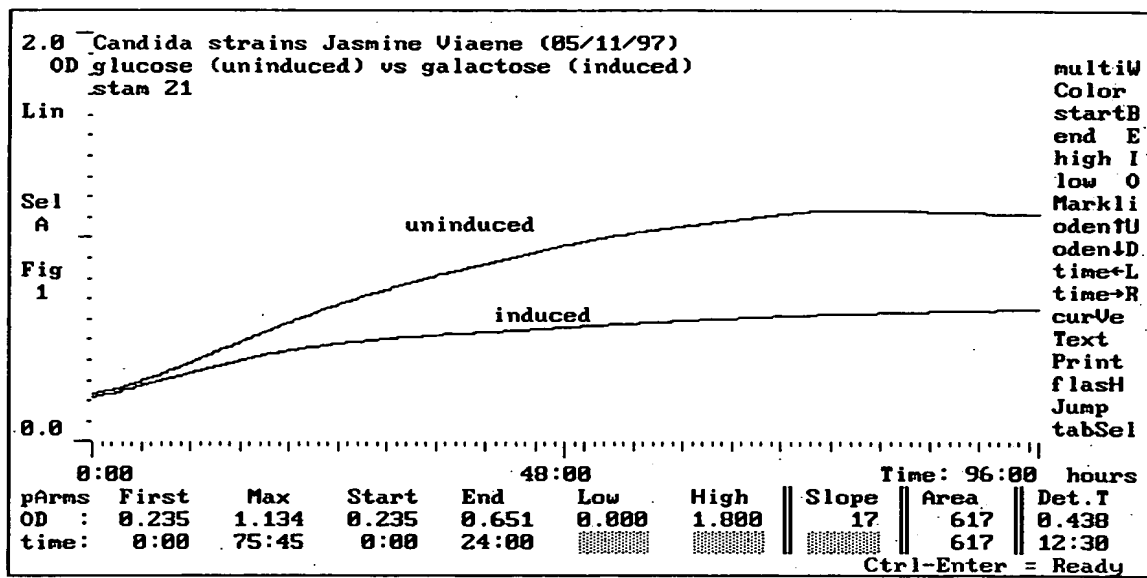
CP211-234+AF231-254 28/04/98 IVR
glucose/maltose vs galactose/maltose
sample CP214

OD (600 nm)



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FIG. 26.



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FIG. 27.

C. albicans library screening experiment 15/12/97
glucose vs galactose
genom. sample 222g

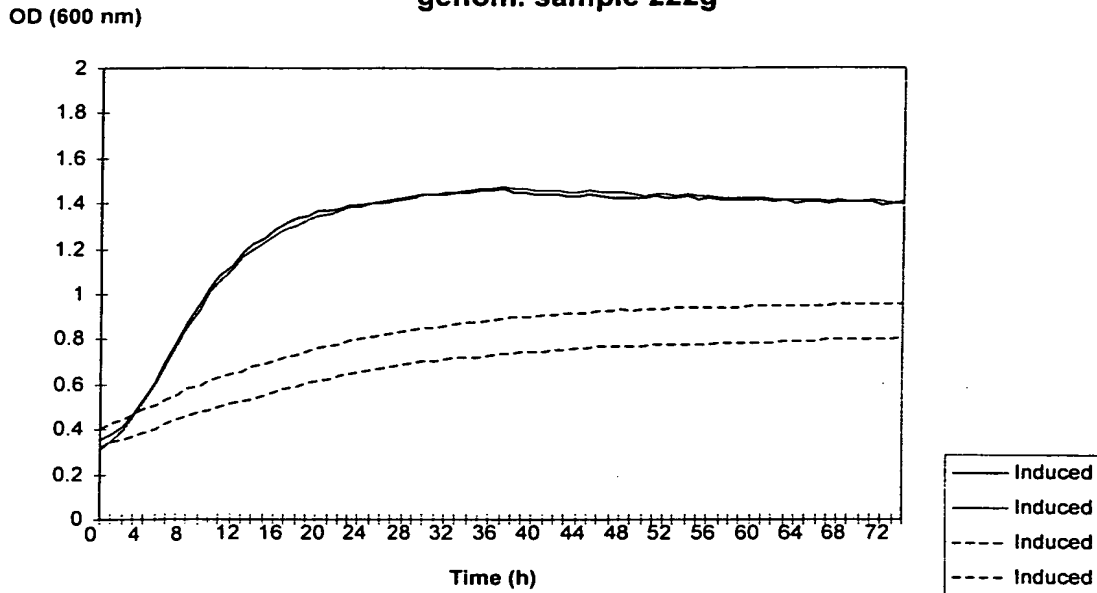
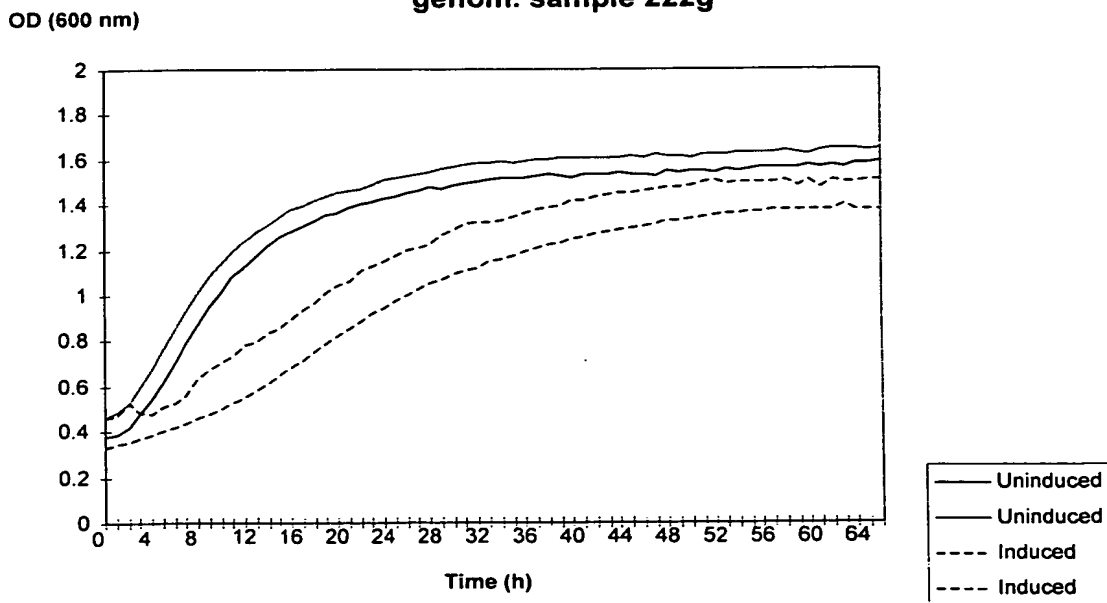


FIG. 28.

C. albicans library screening experiment 19/12/97
glucose/maltose vs galactose/maltose
genom. sample 222g



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FIG. 29.

CP211-234+AF231-254 28/04/98
glucose/maltose vs galactose/maltose
sample CP223

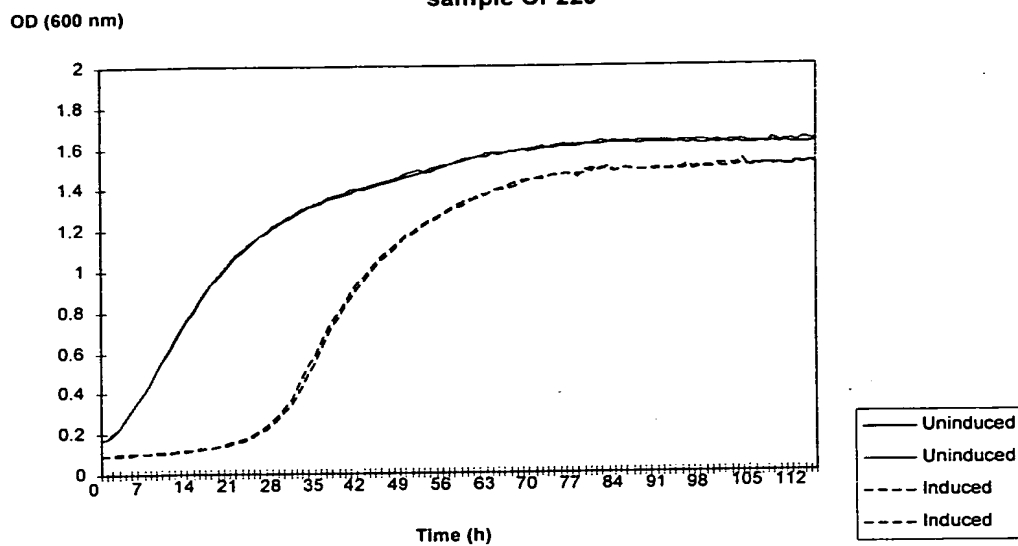
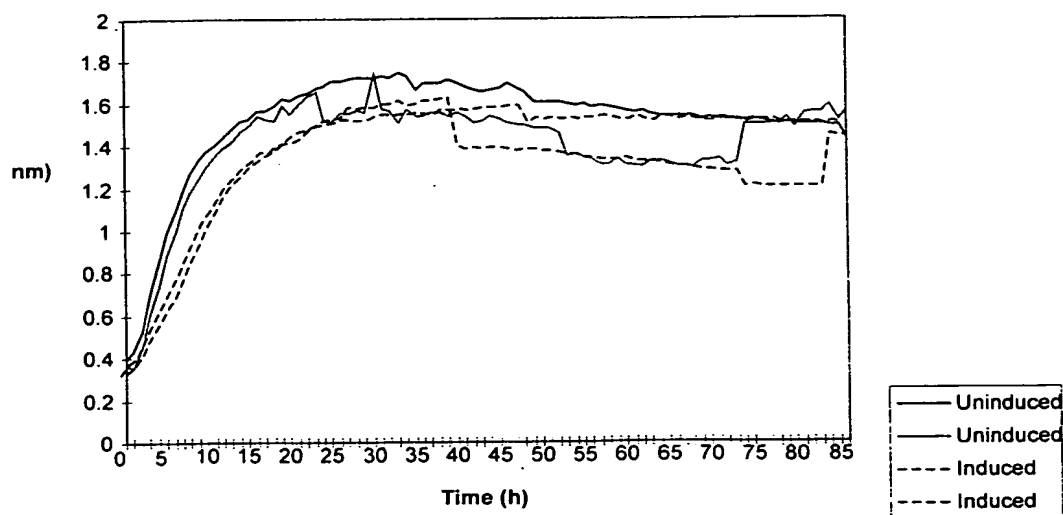


FIG. 30.

C. albicans library screening experiment 24/04/98
glucose/maltose vs galactose/maltose
sample 226af



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FIG. 31.

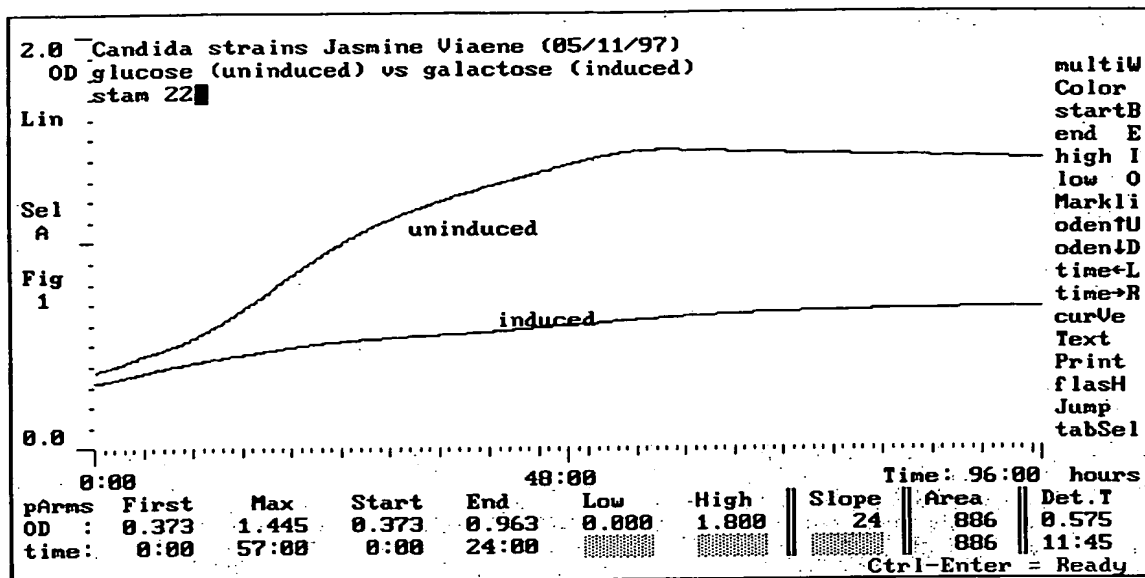
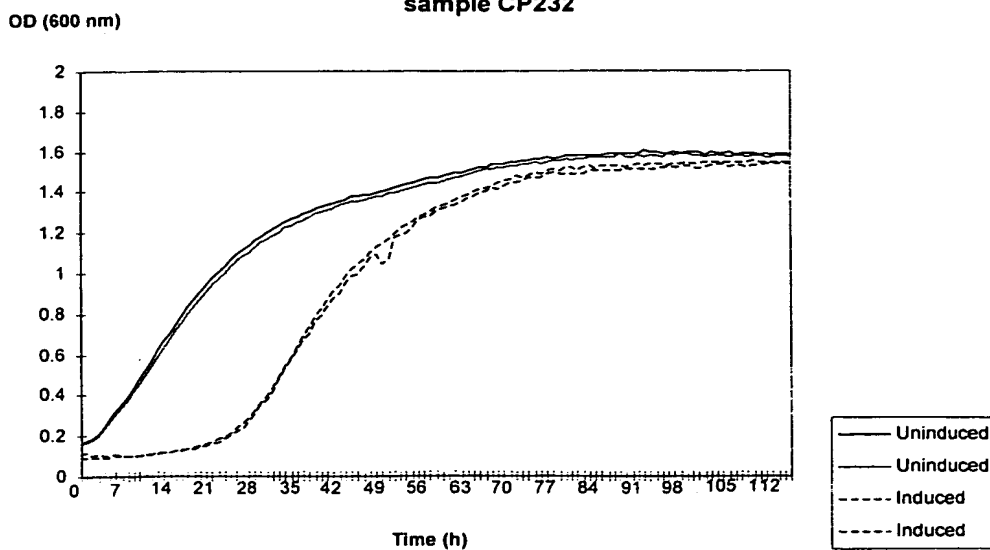


FIG. 32.

CP211-234+AF231-254 28/04/98
 glucose/maltose vs galactose/maltose
 sample CP232



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FIG. 33.

CP211-234+AF231-254 28/04/98
glucose/maltose vs galactose/maltose
sample CP233

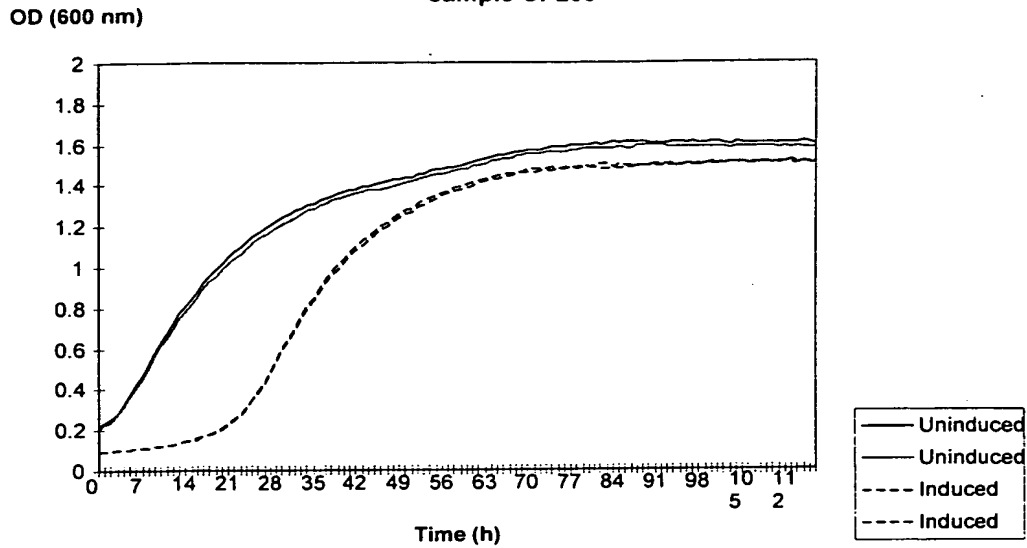
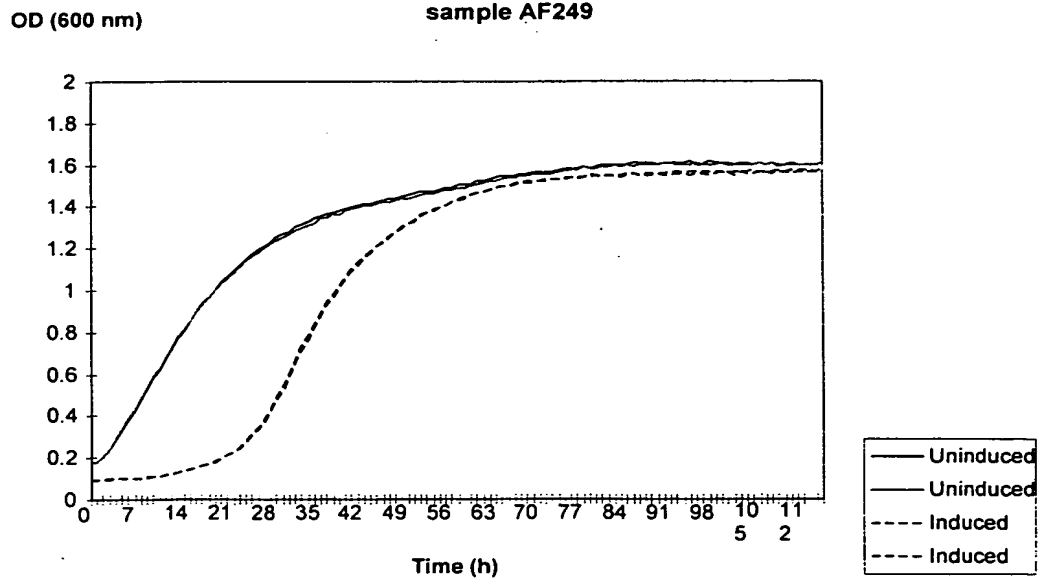


FIG. 34.

CP211-234+AF231-254 28/04/98 IVR
glucose/maltose vs galactose/maltose
sample AF249



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FIG. 35.

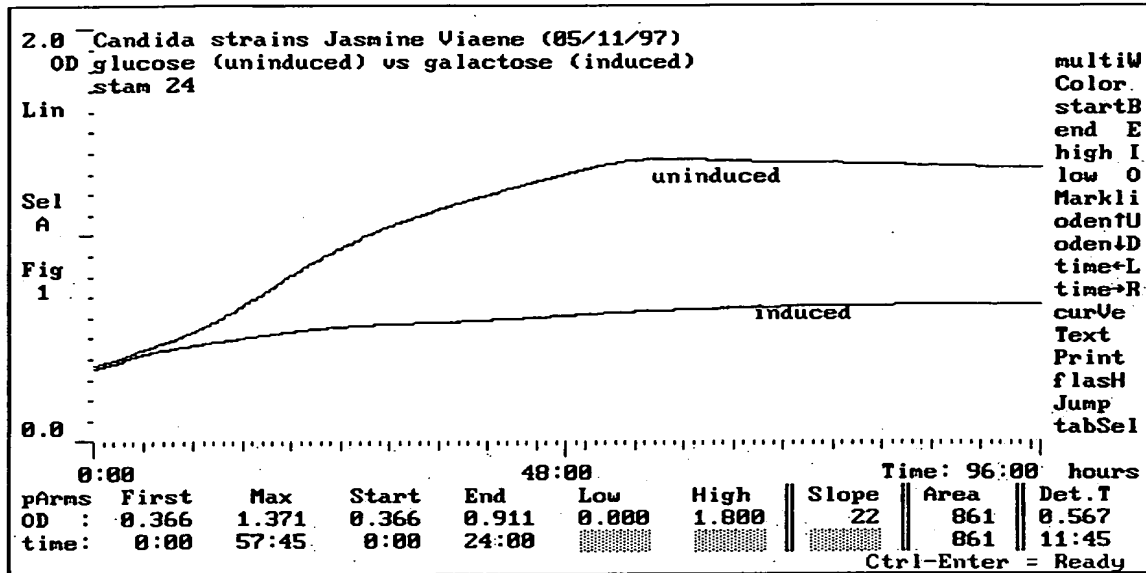
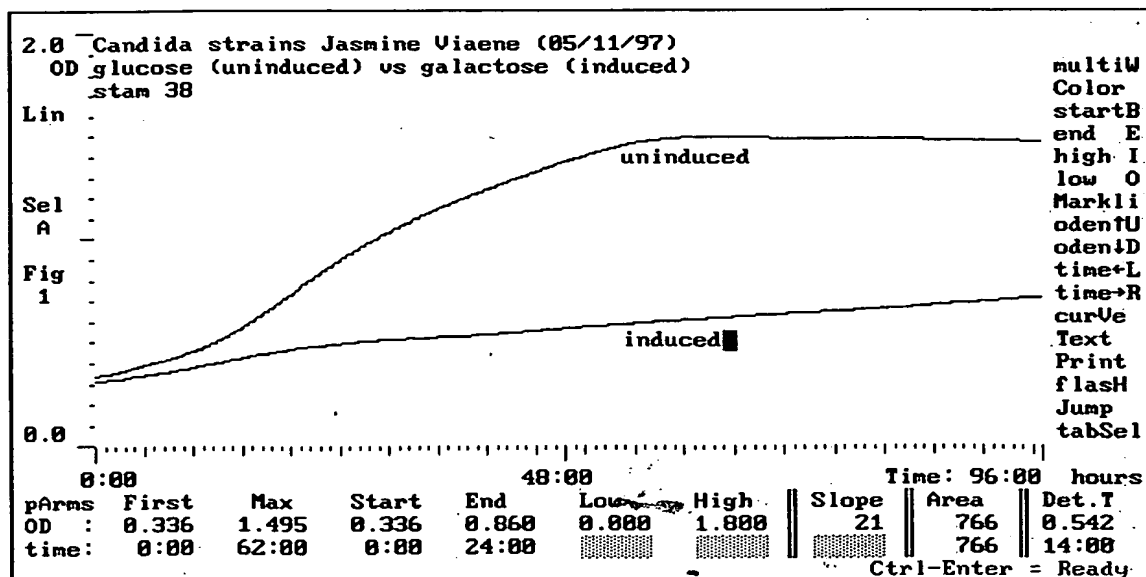


FIG. 36.



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FIG. 37.

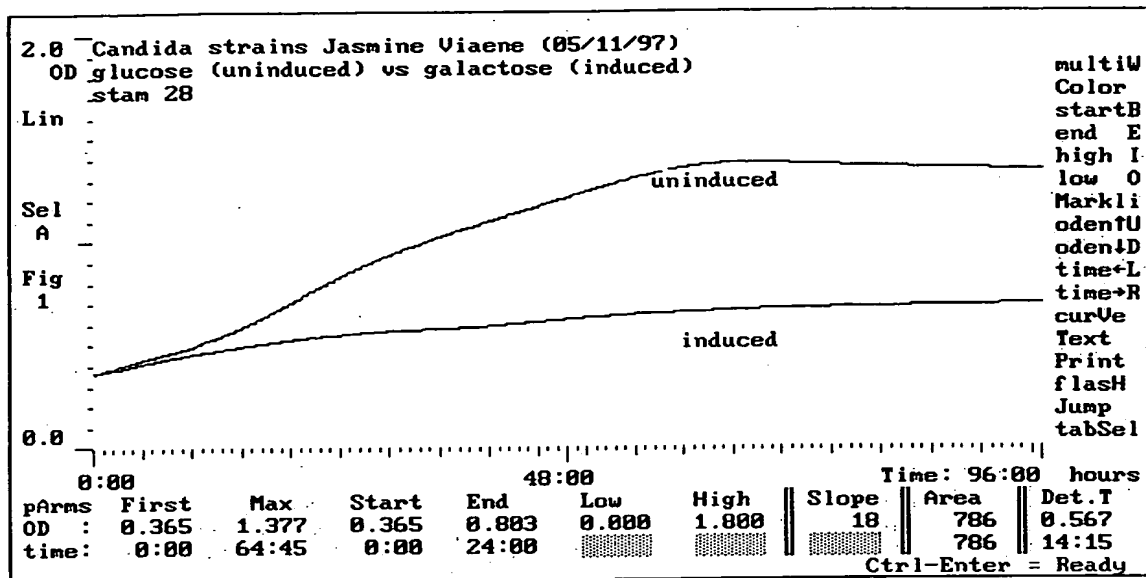
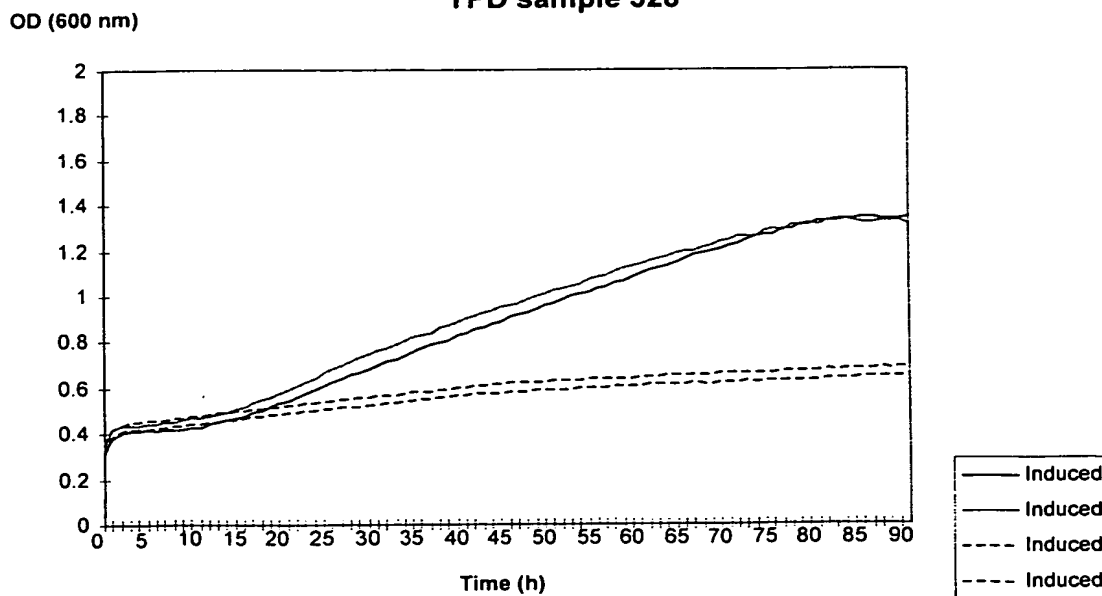


FIG. 38.

C. albicans library screening experiment 27/10/97
 glucose vs galactose
 YPD sample 328



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FIG. 39

C. albicans cDNA library screening 12-02-98
glucose/maltose vs galactose/maltose
YPD sample 357

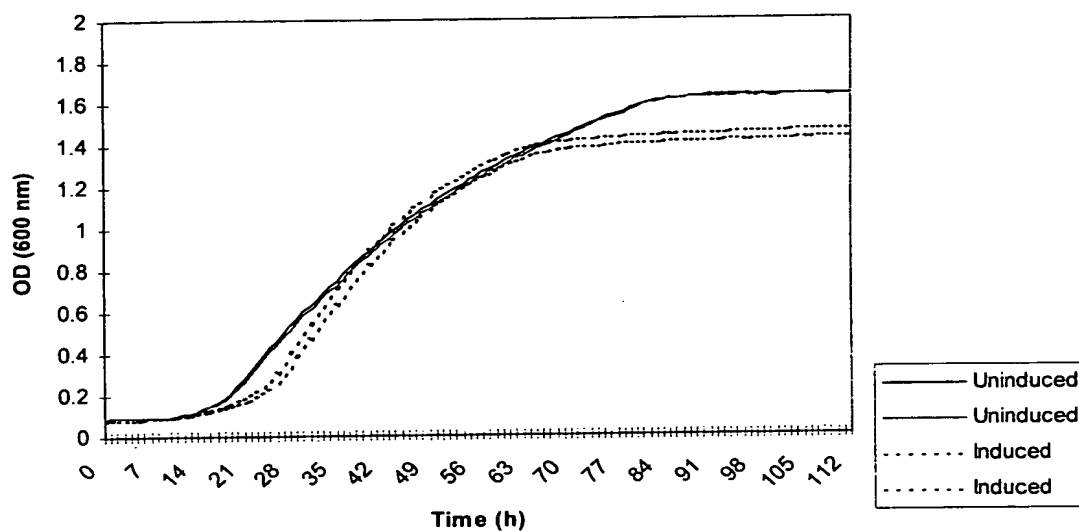
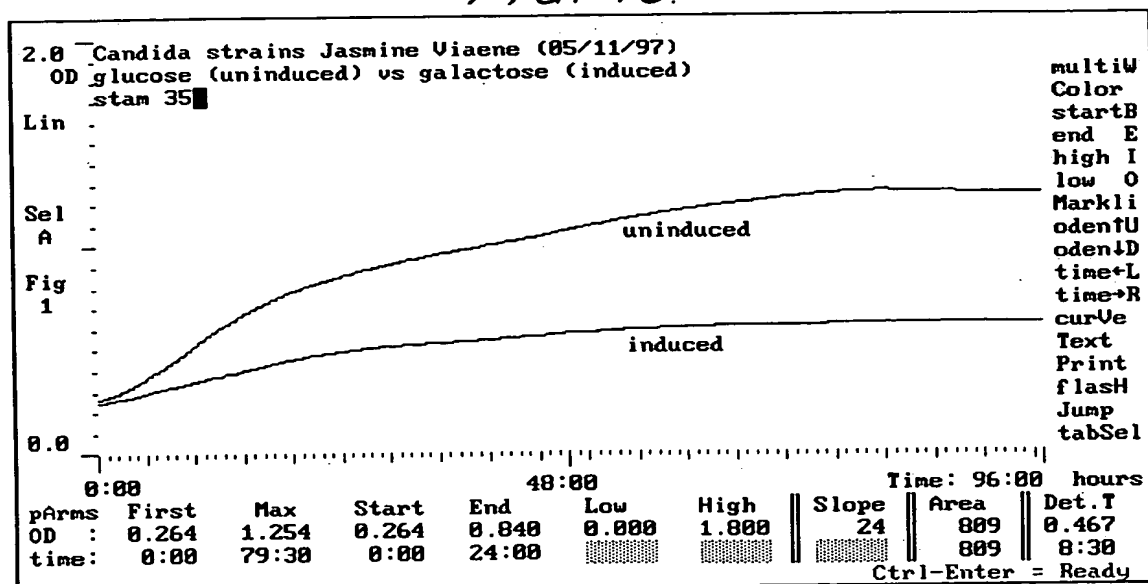


FIG. 40.



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FIG. 41.

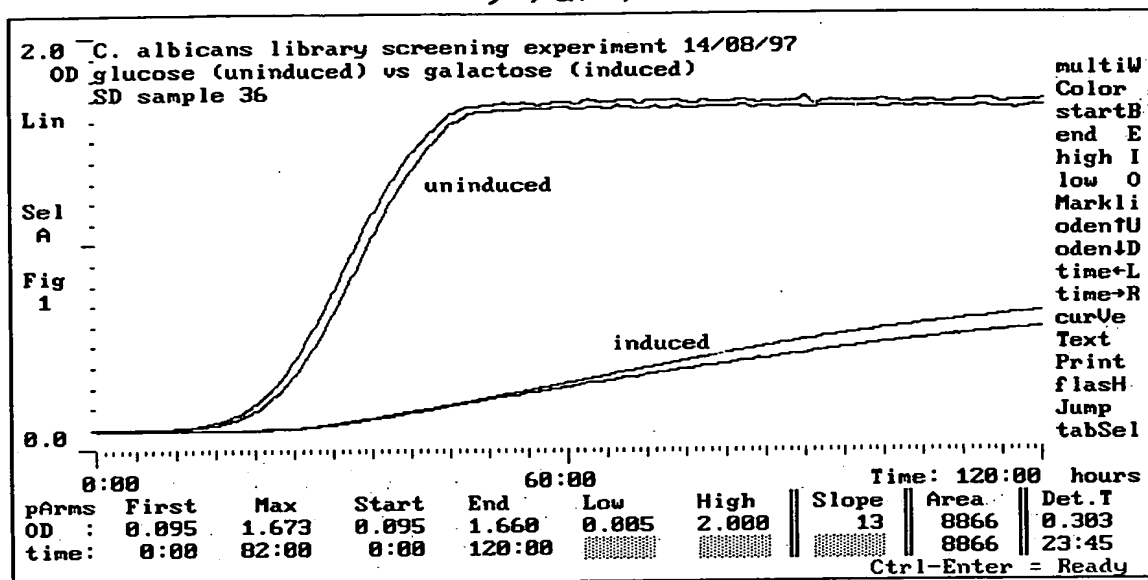
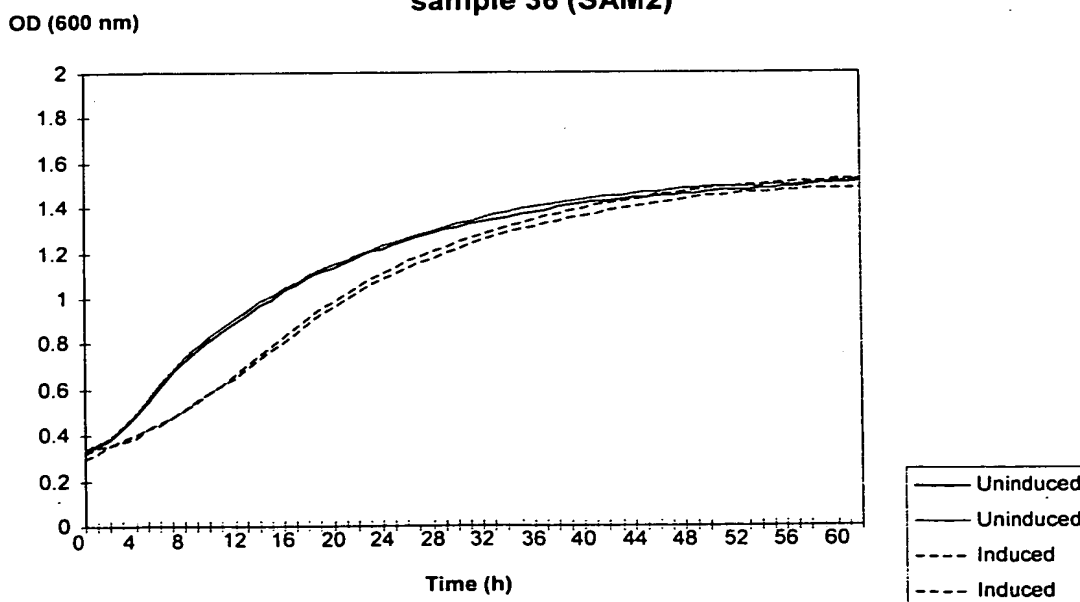


FIG. 42.

C. albicans library screening experiment 28/11/97
 glucose/maltose vs galactose/maltose
 sample 36 (SAM2)



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FIG. 43.

C. albicans cDNA library screening 05/02/98
glucose/maltose vs galactose/maltose
YPD sample 360

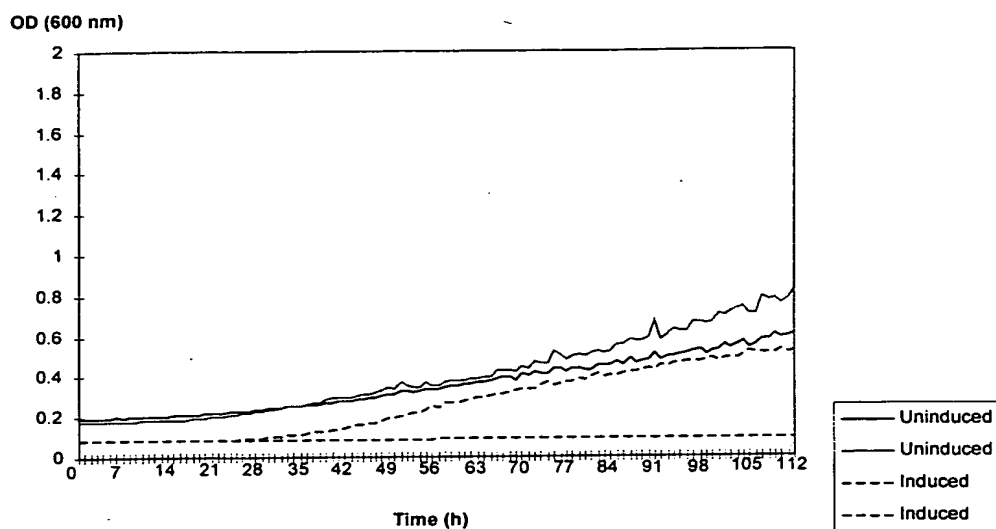
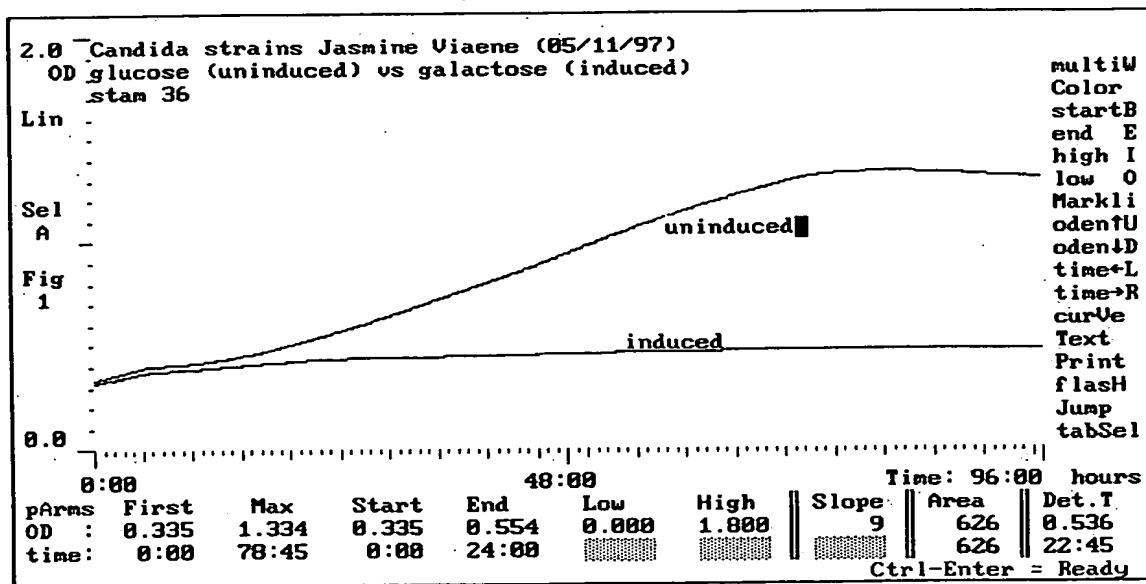


FIG. 44.



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FIG. 45.

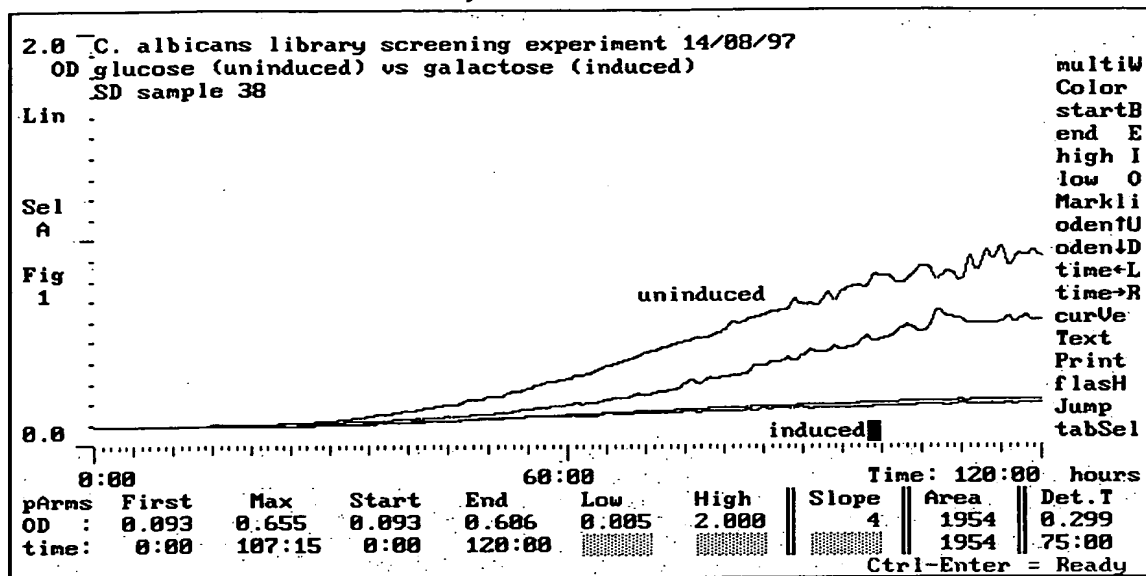
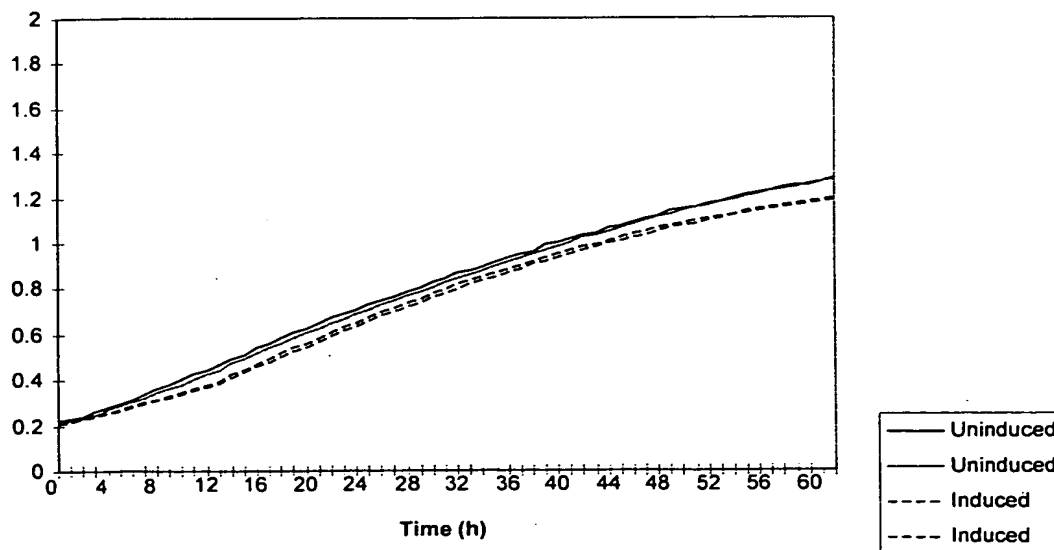


FIG. 46.

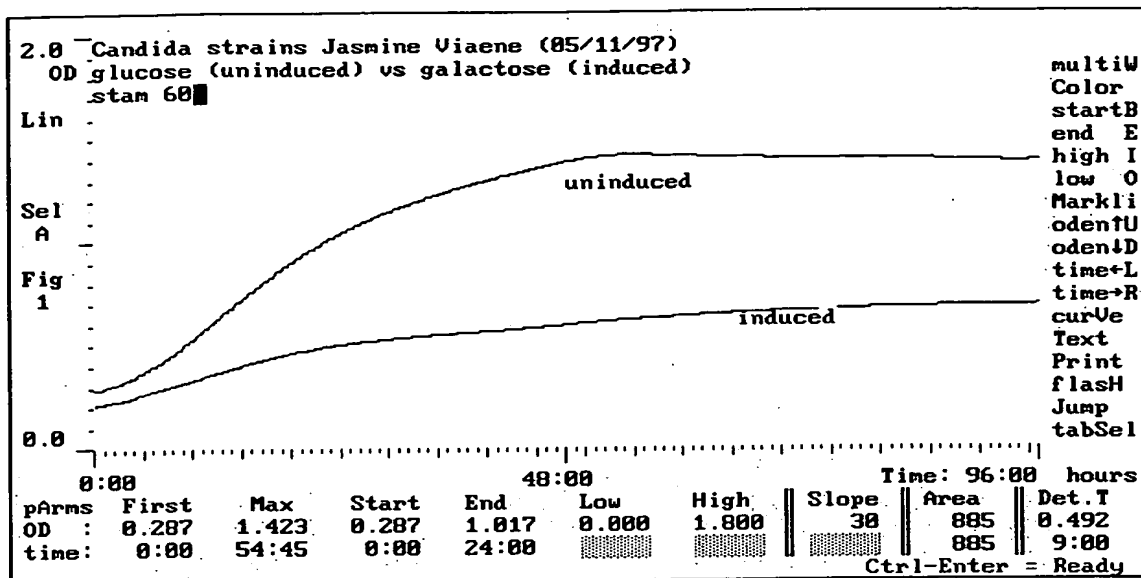
C. albicans library screening experiment 28/11/97
 glucose/maltose vs galactose/maltose
 sample 38 (RNR)

OD (600 nm)



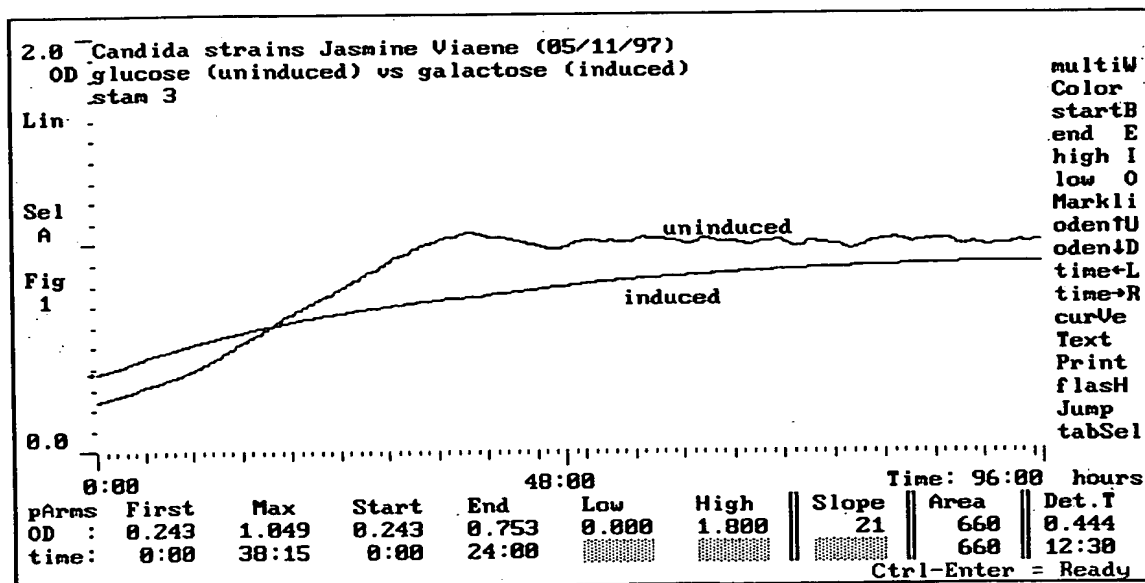
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FIG. 47.



60gK (RAD18)

FIG. 48.



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FIG. 49.

C. albicans cDNA library screening 12-02-98
glucose/maltose vs galactose/maltose
YPD sample 409

OD (600 nm)

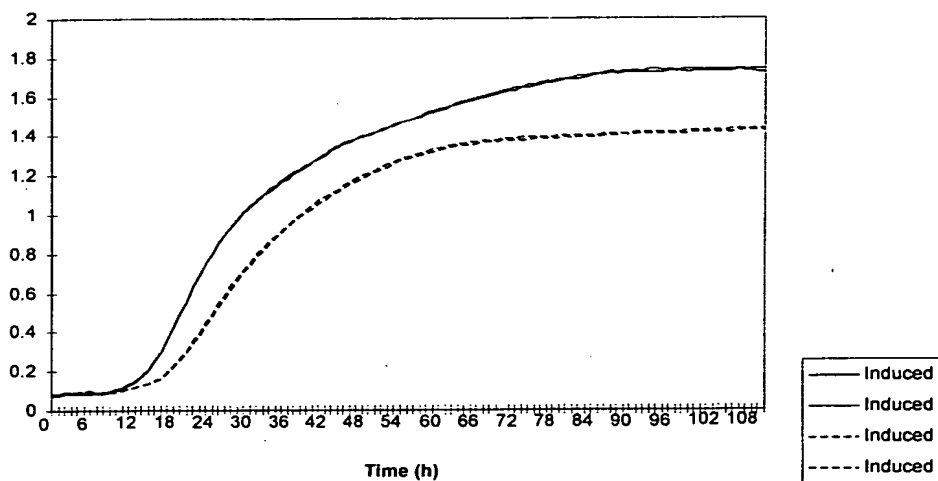
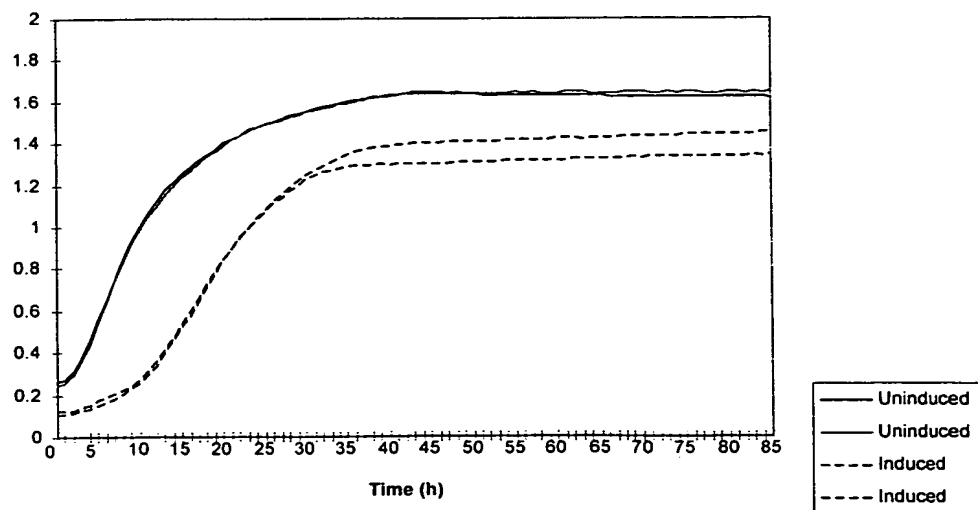


FIG. 50.

C. albicans library screening experiment 27/03/98
glucose/maltose vs galactose/maltose
sample 40AF

OD (600 nm)



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FIG. 51.

C. albicans library screening experiment 17/03/98
glucose/maltose vs galactose/maltose
SD sample 485c

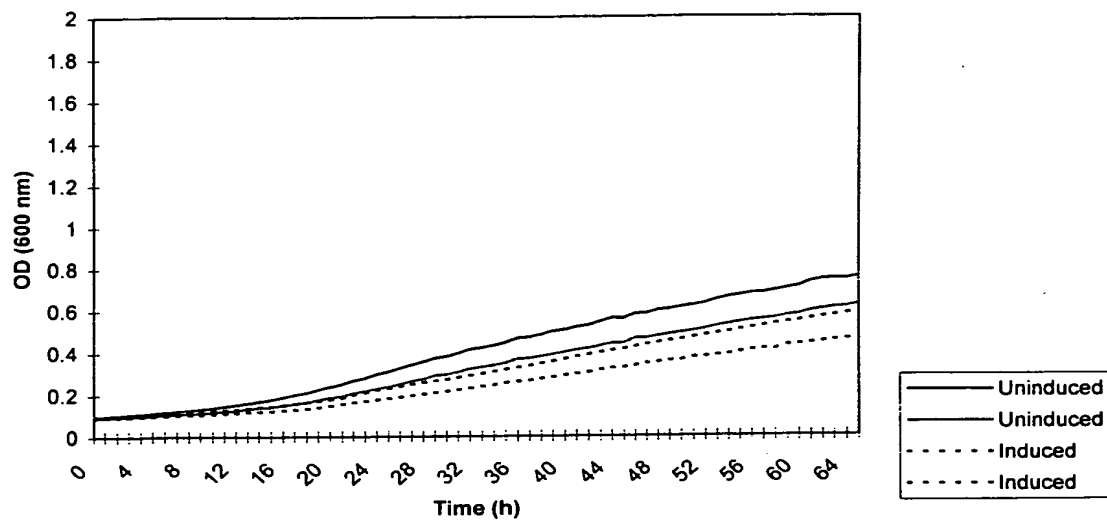
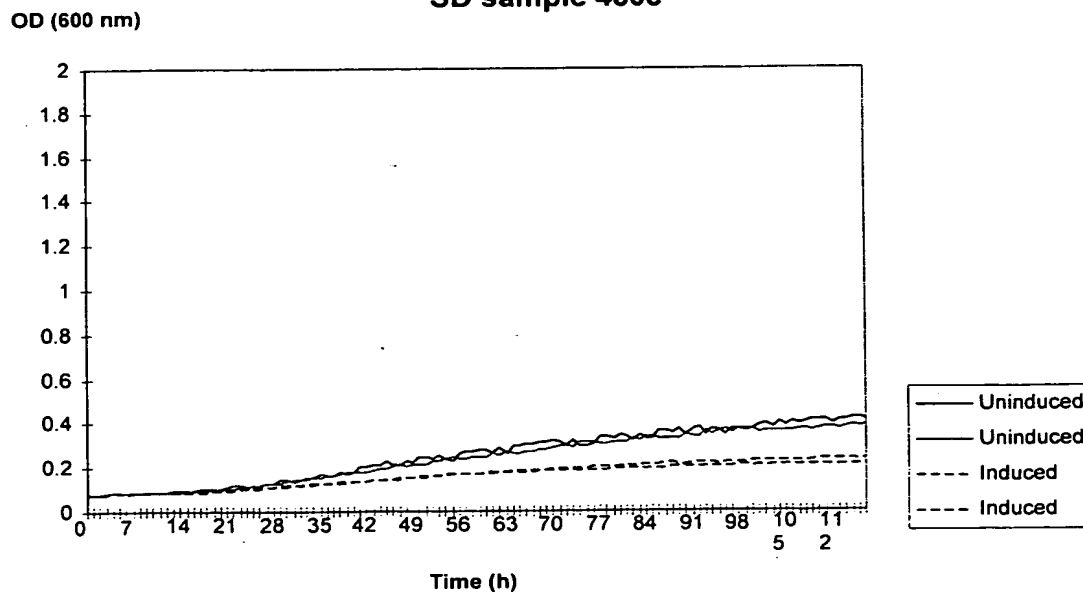


FIG. 52.

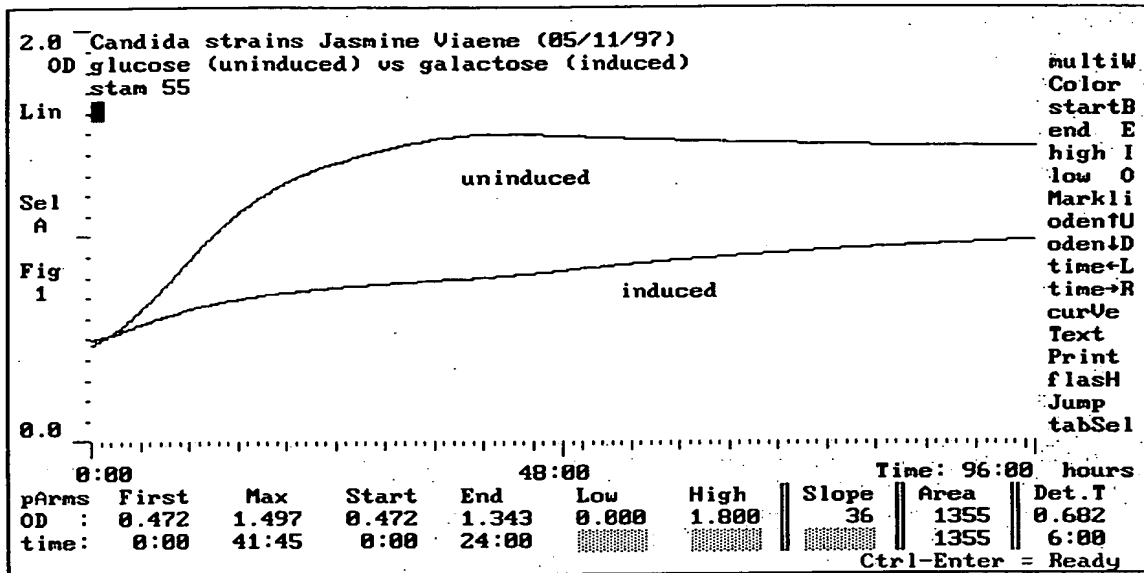
C. albicans cDNA library screening 10-03-98
glucose vs galactose
SD sample 480c



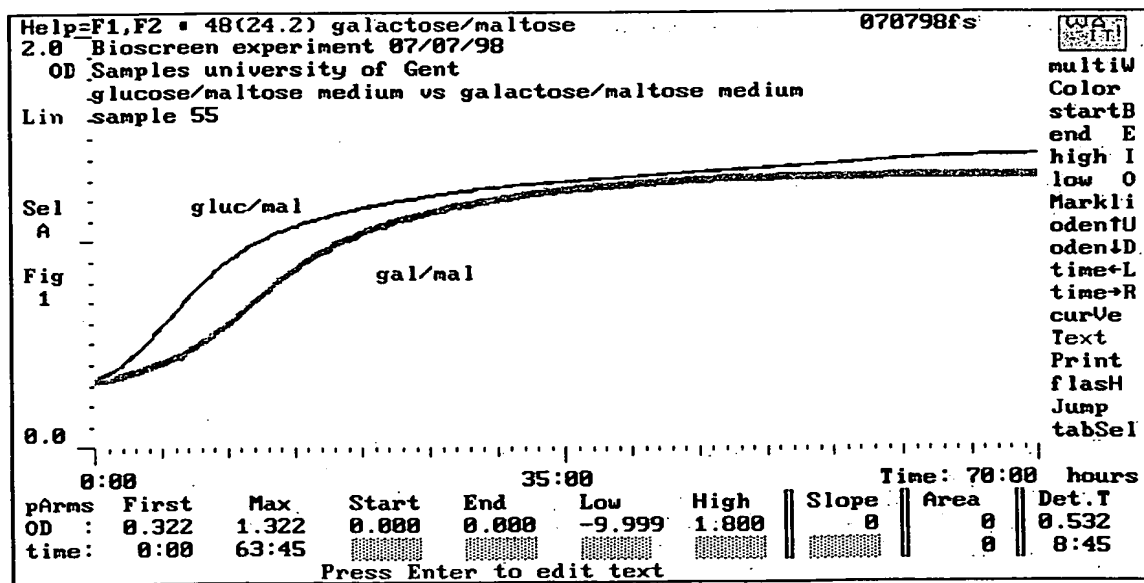
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FIG. 53.

(a)



(b)



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FIG. 54.

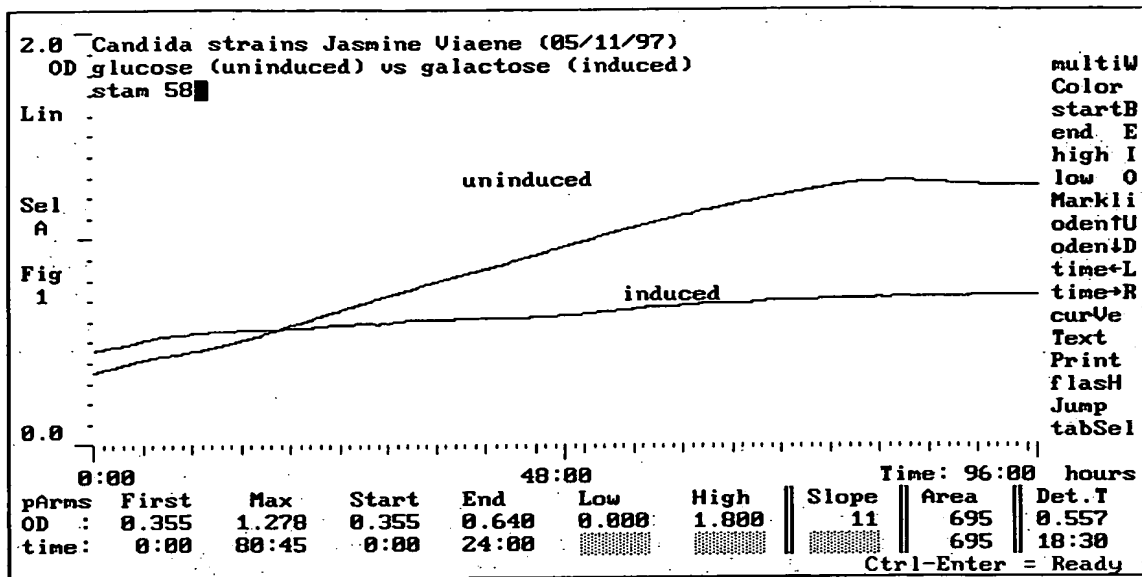
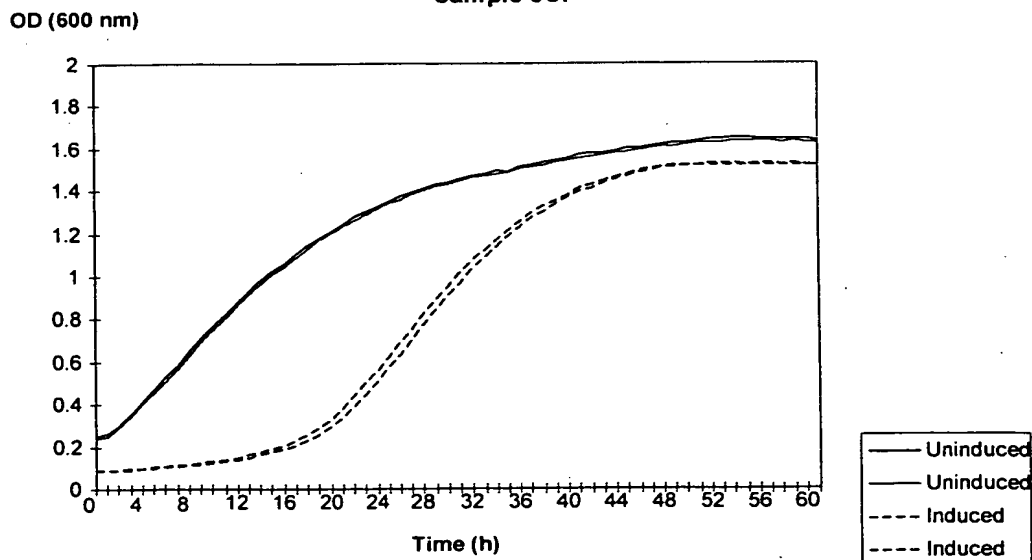


FIG. 55.

C. albicans library screening experiment 31/03/98
 glucose/maltose vs galactose/maltose
 sample 8CP



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FIG. 56.

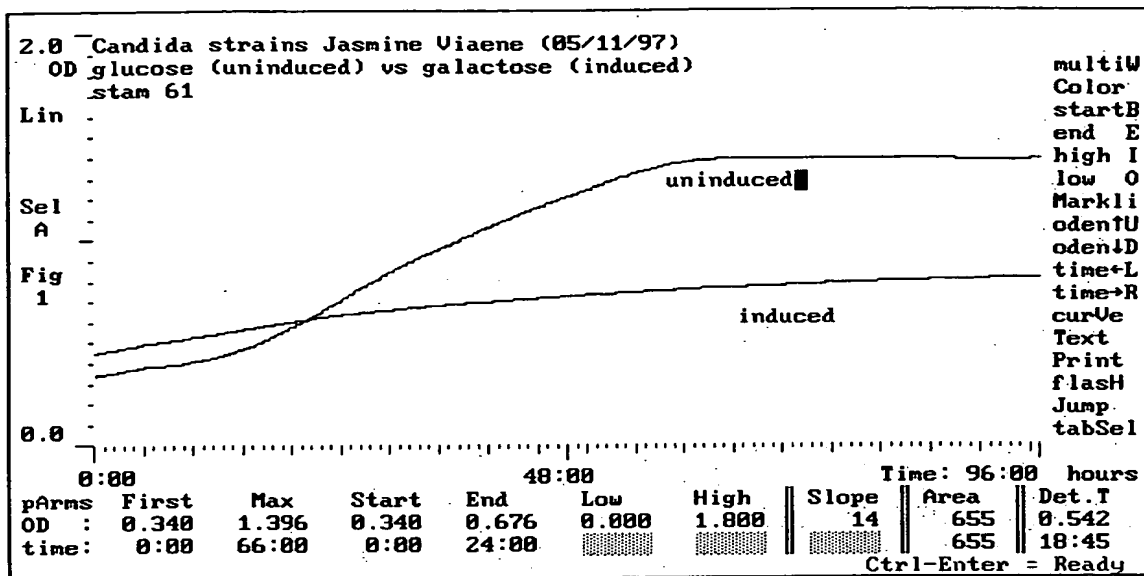
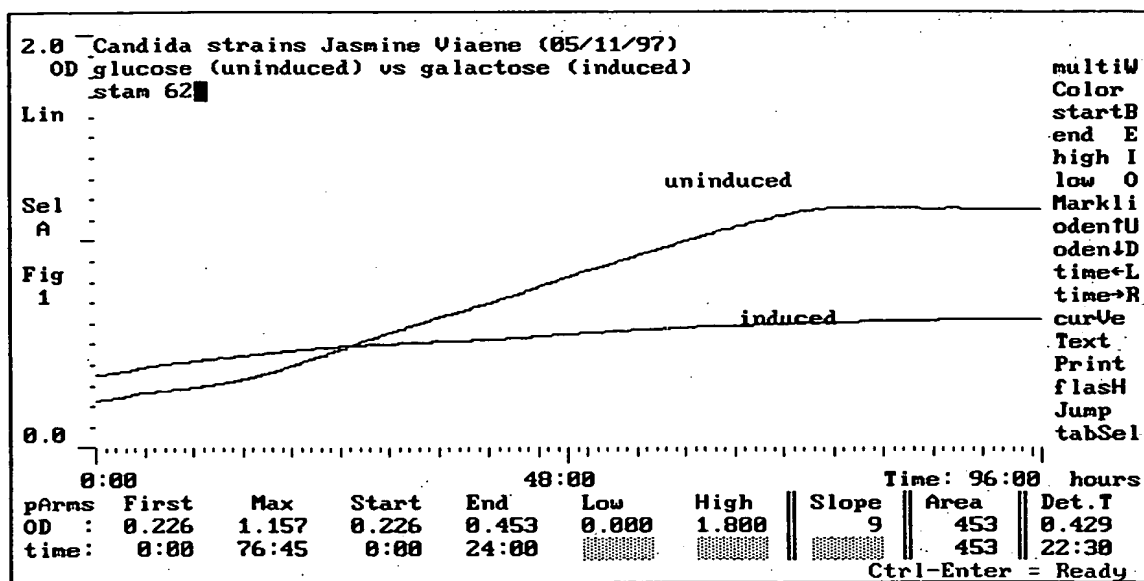


FIG. 57.



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FIG. 58.

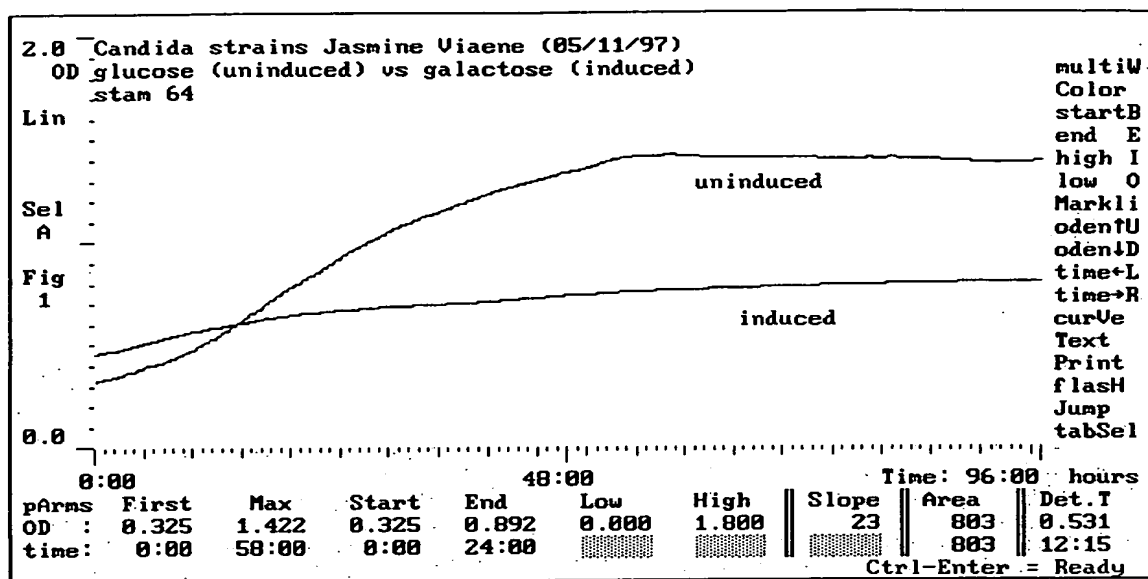
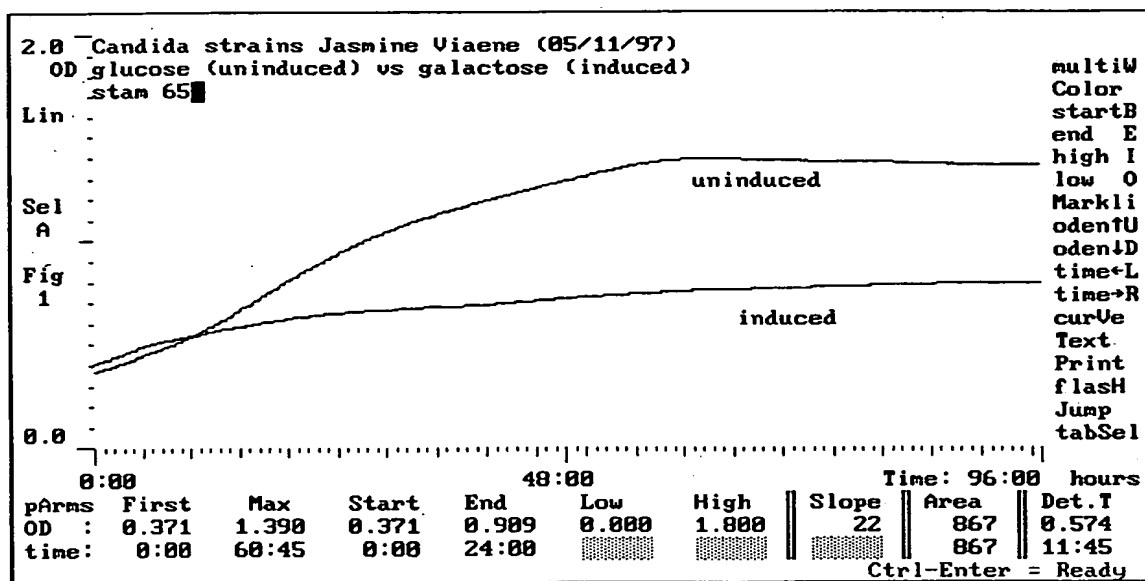


FIG. 59.



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FIG. 60.

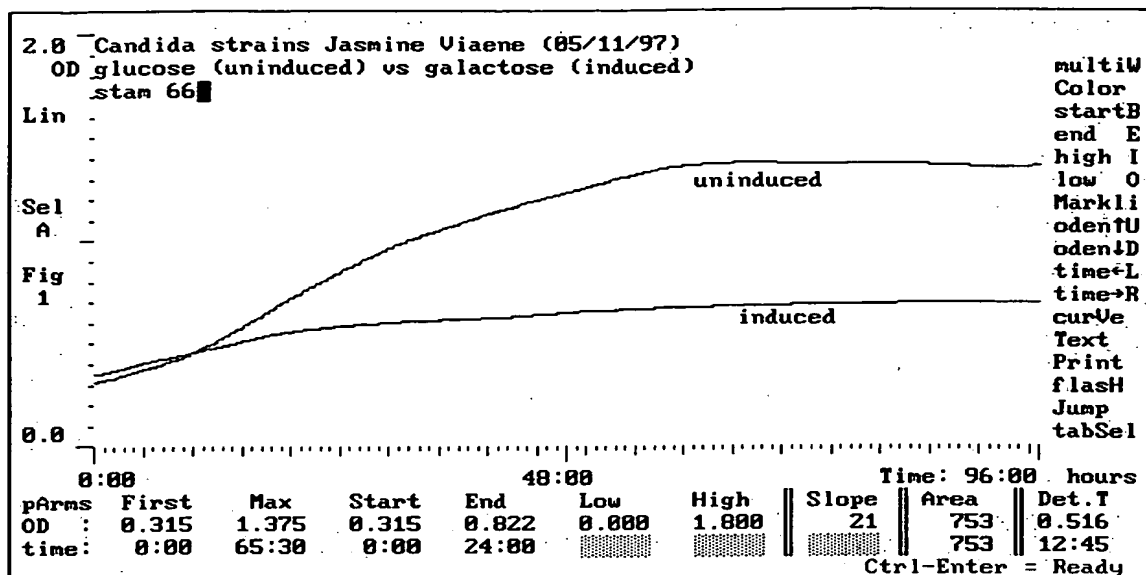
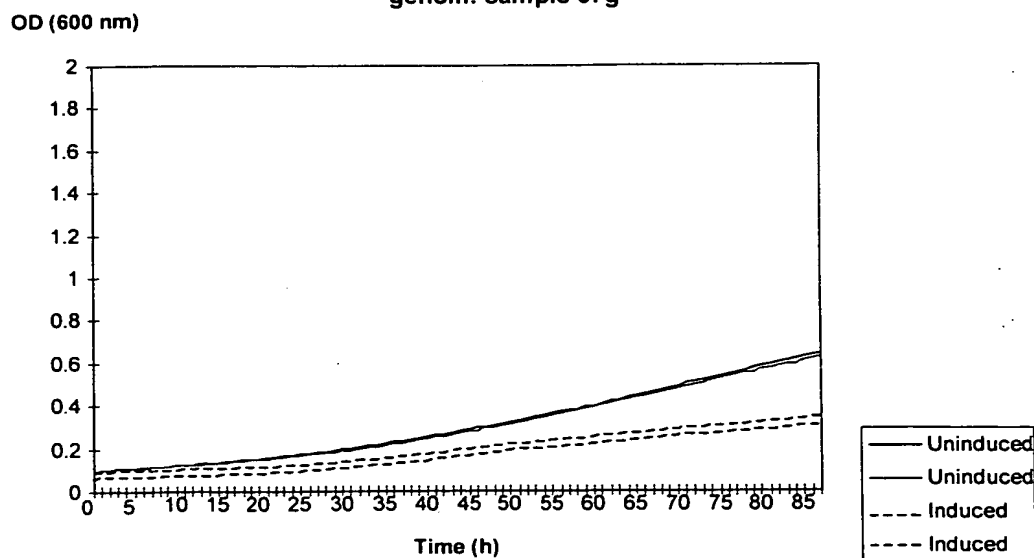


FIG. 61.

C. albicans library screening experiment 21/11/97
 glucose vs galactose
 genom. sample 67g



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FIG. 62.

C. albicans library screening experiment 21/11/97
glucose vs galactose
genom. sample 80g

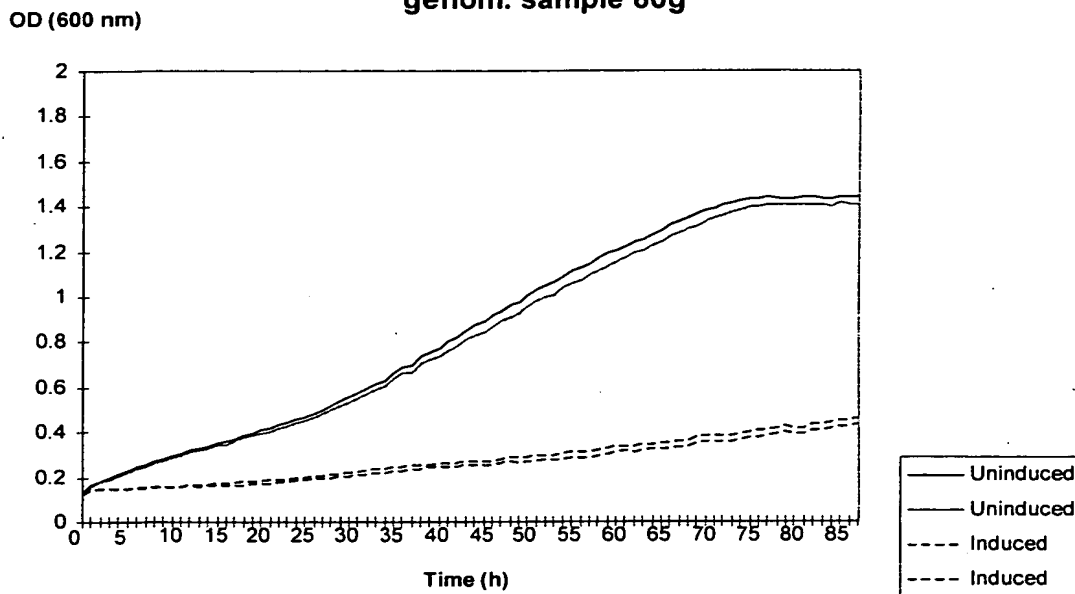
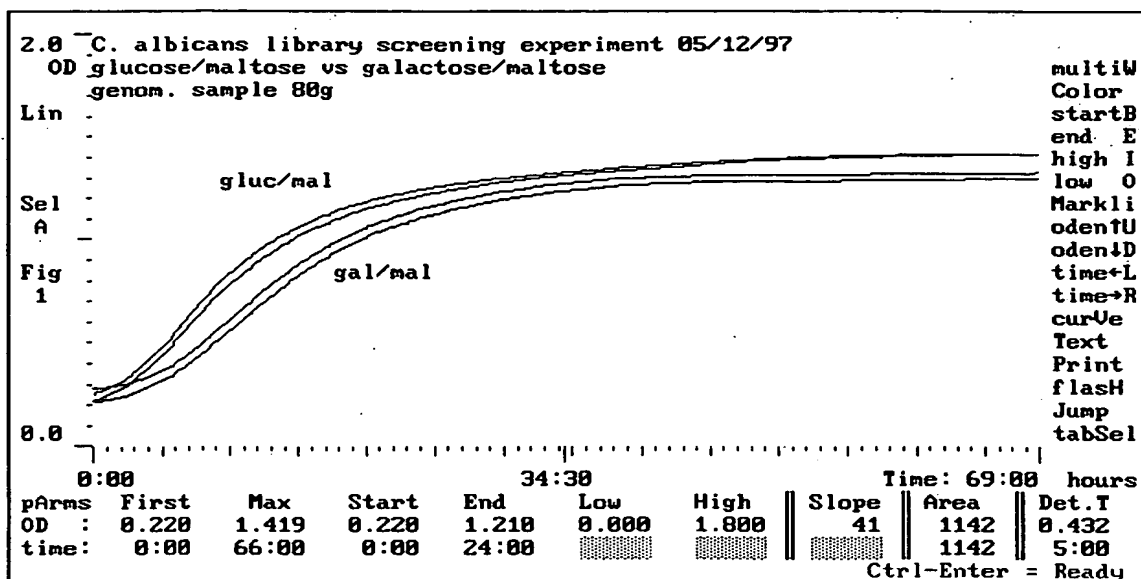
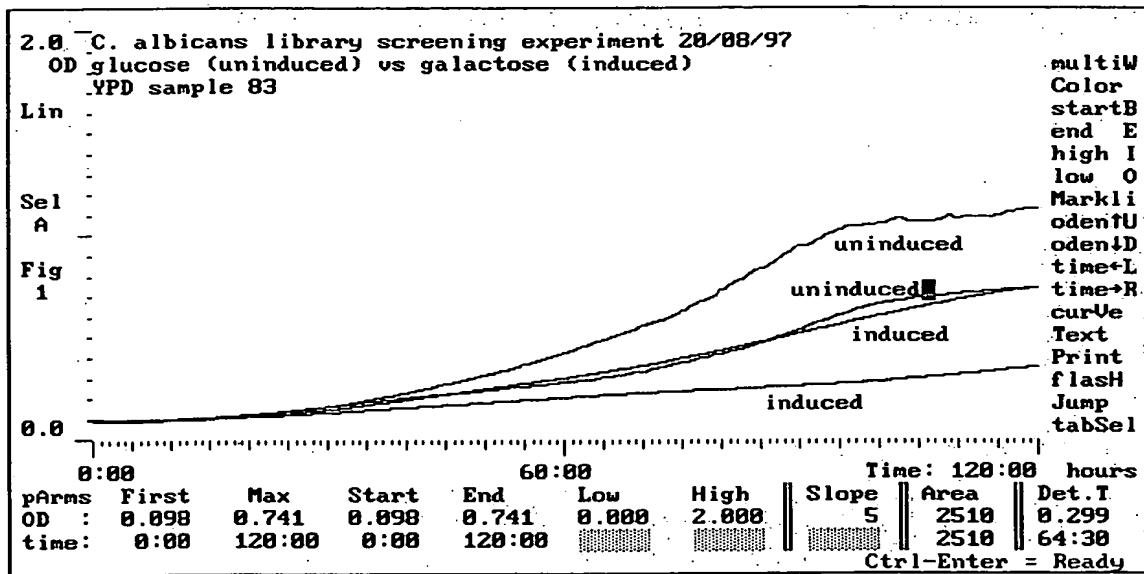


FIG. 63.



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FIG. 64.



83c3 (SHA3)

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FIG. 65.

C. albicans library screening experiment 21/11/97
glucose vs galactose
genom. sample 85g

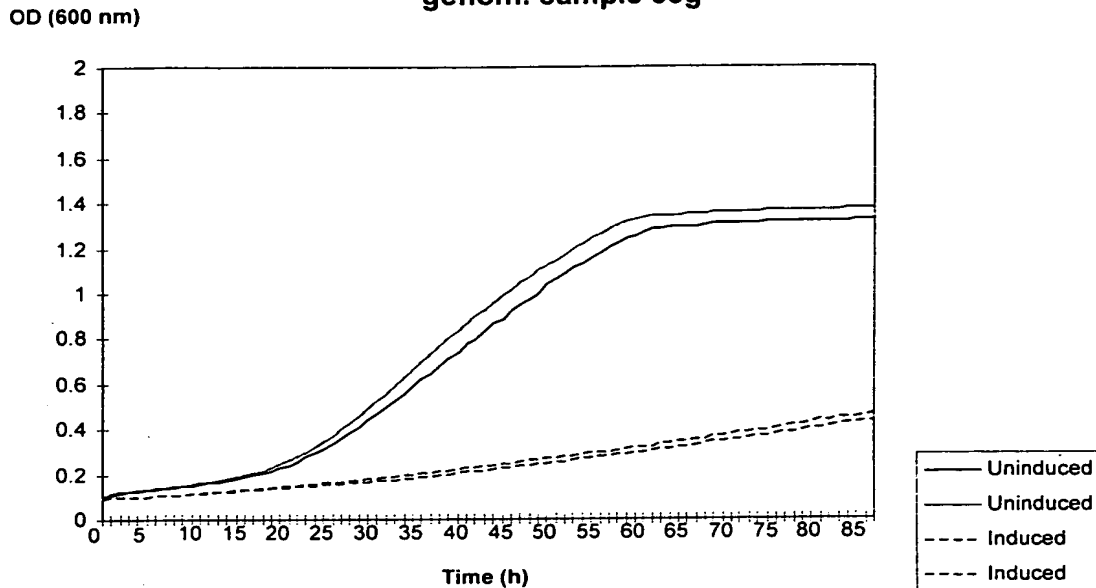
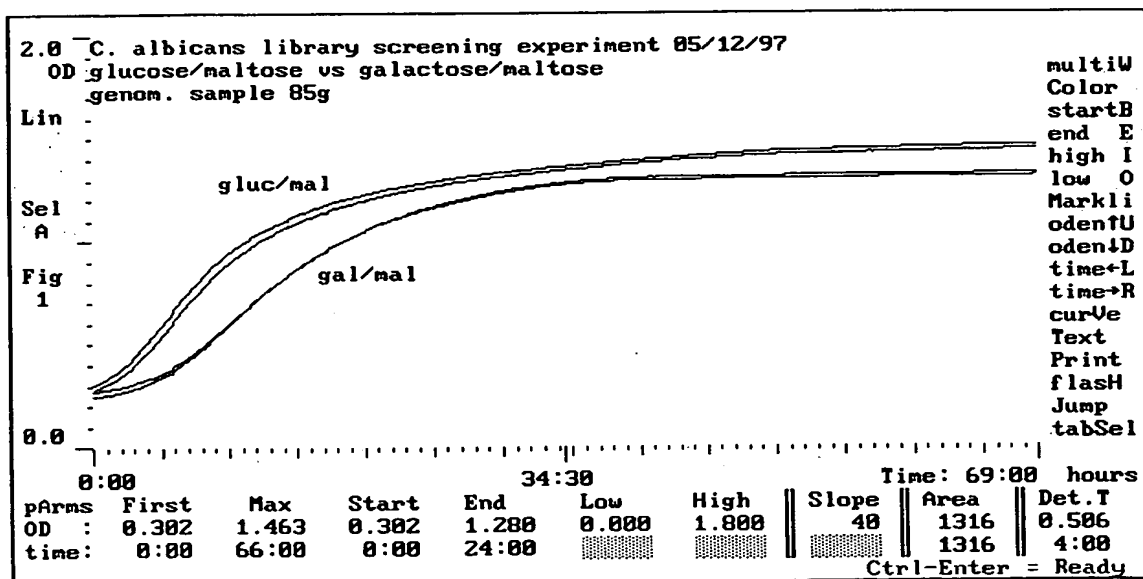


FIG. 66.



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FIG. 67.

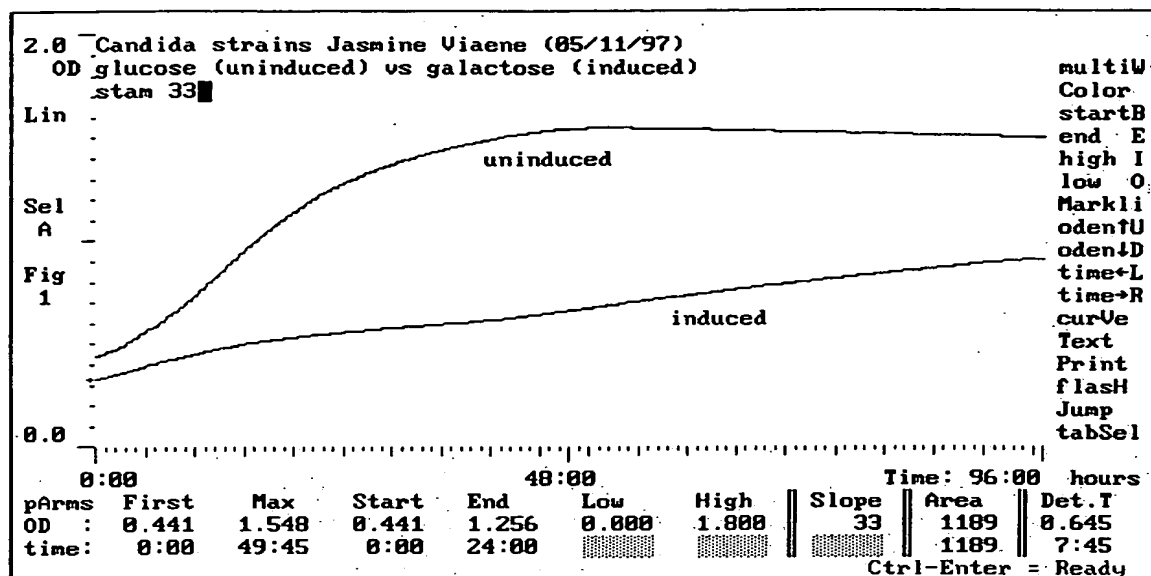
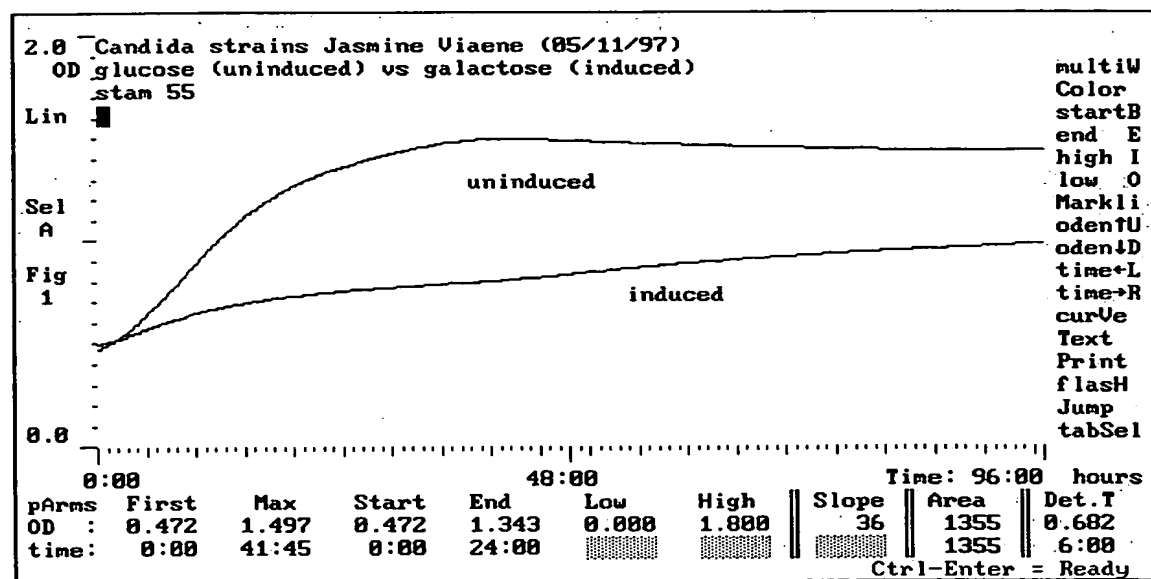


FIG. 68.



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FIG. 69.

C. albicans library screening experiment 21/11/97
glucose vs galactose
genom. sample 99g

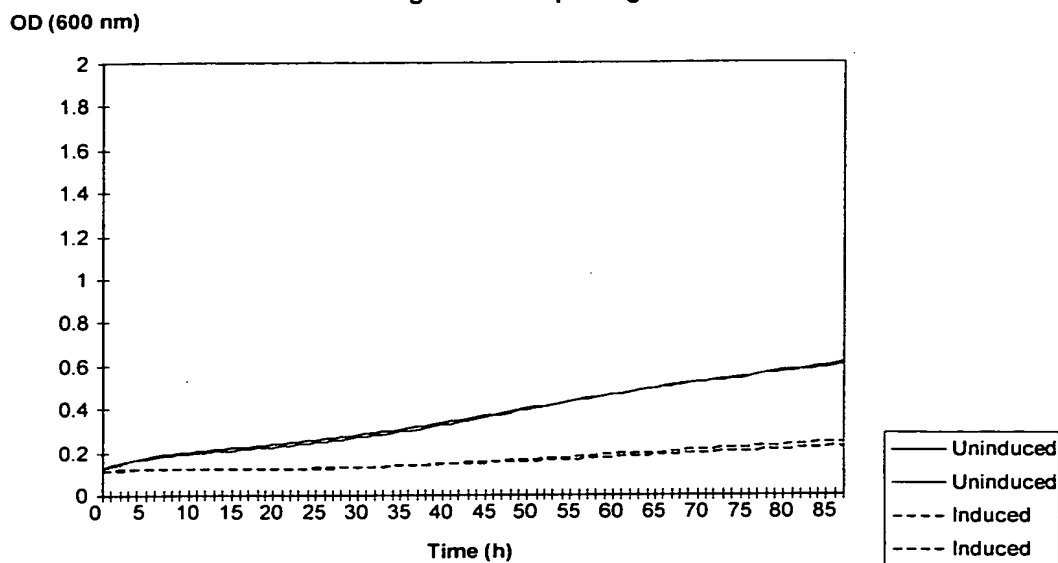
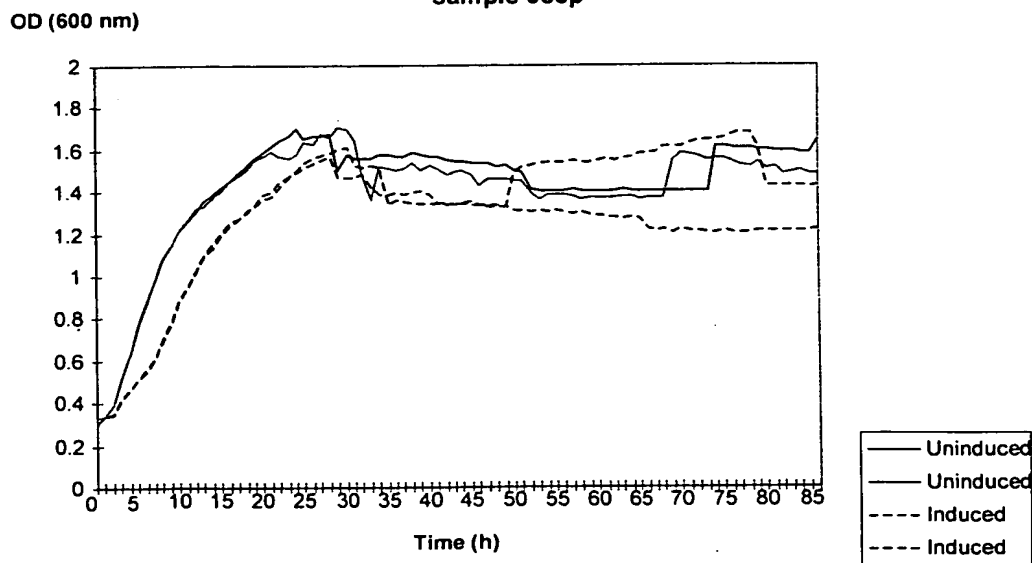
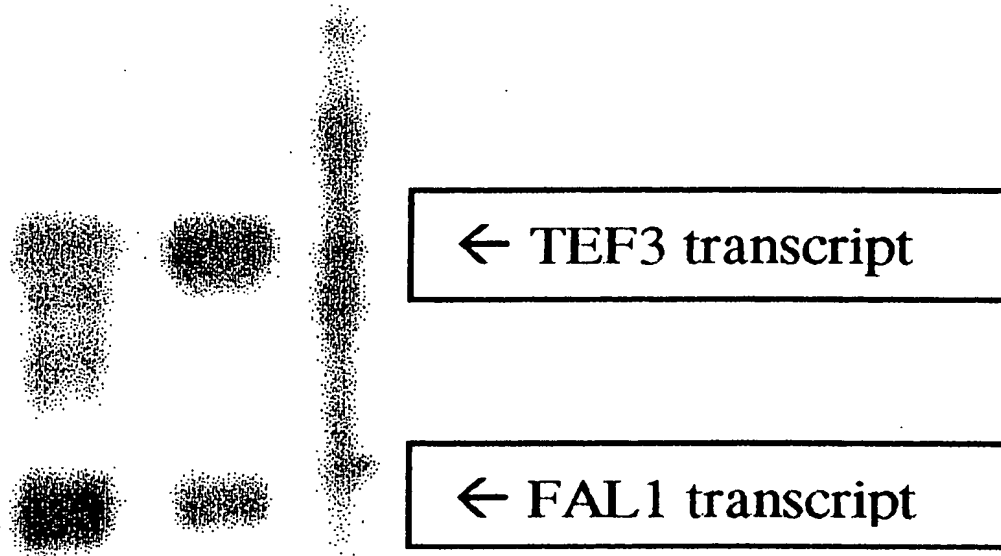


FIG. 70.

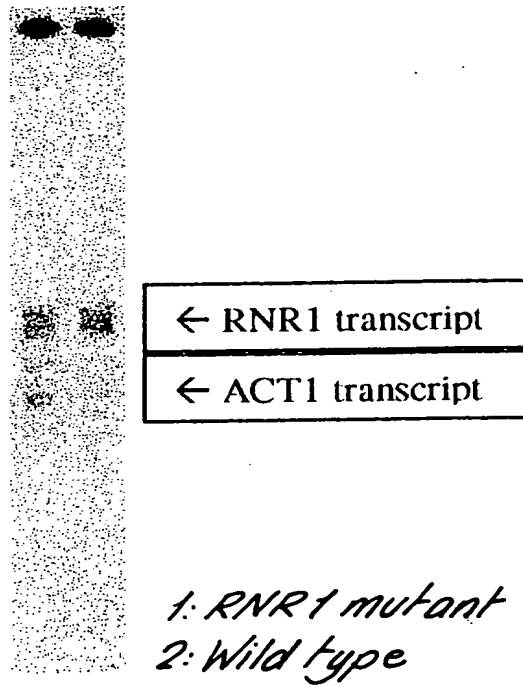
C. albicans library screening experiment 24/04/98
glucose/maltose vs galactose/maltose
sample 98cp



*64/75**FIG. 71*

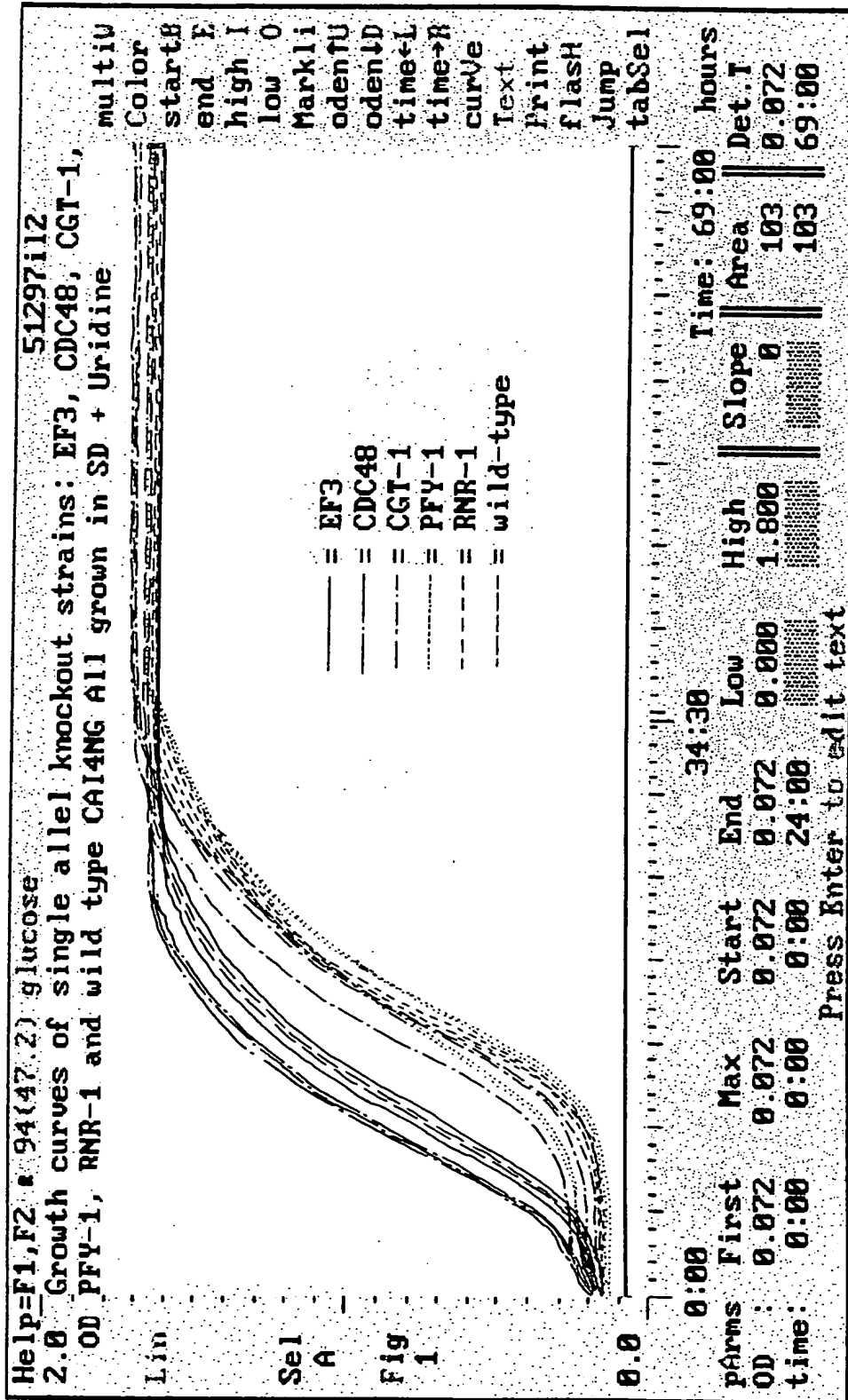
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FIG. 73.



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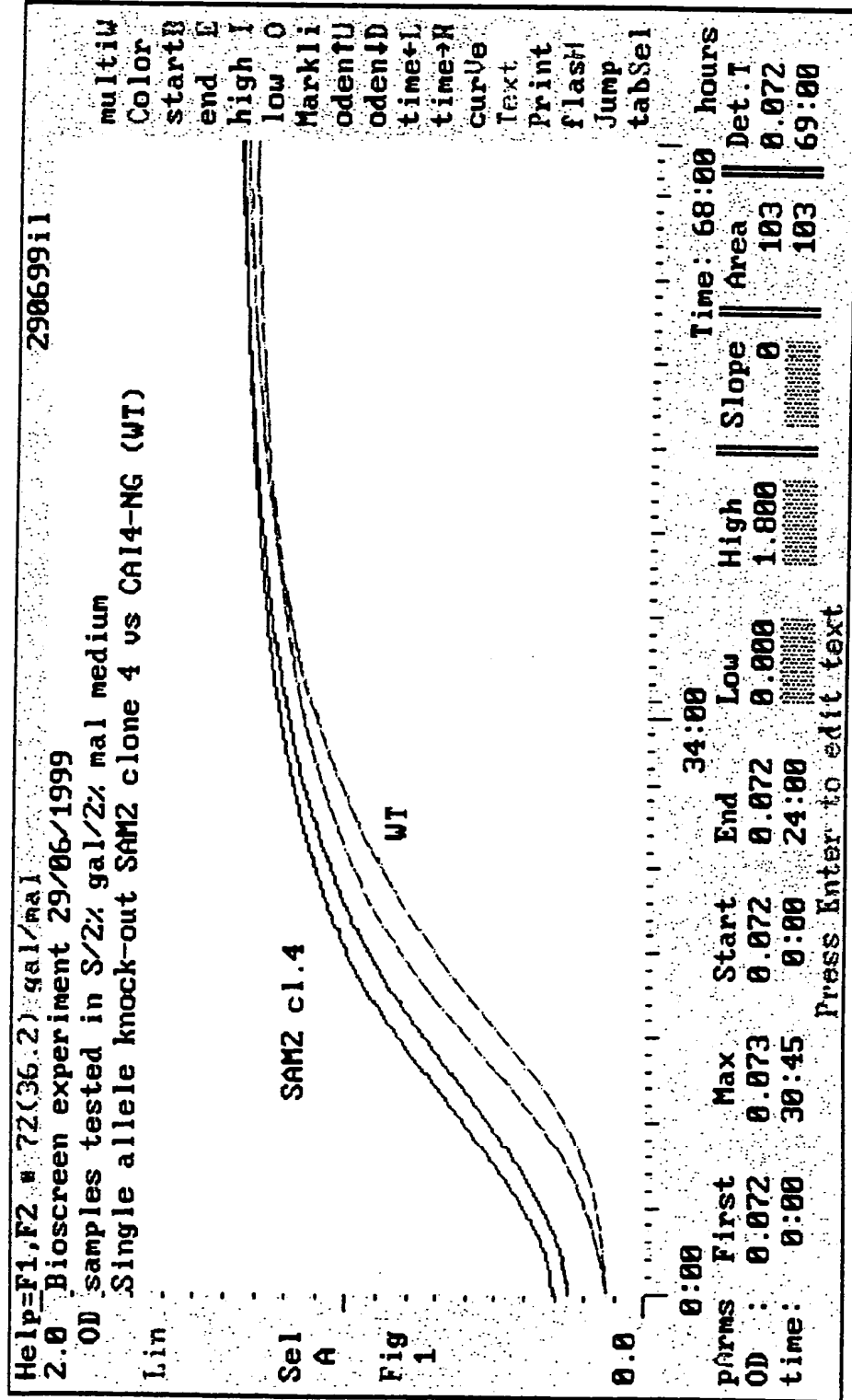
FIG 74.



The RNR1 single allele knock-out shows an extended LAG phase compared to the wild type.

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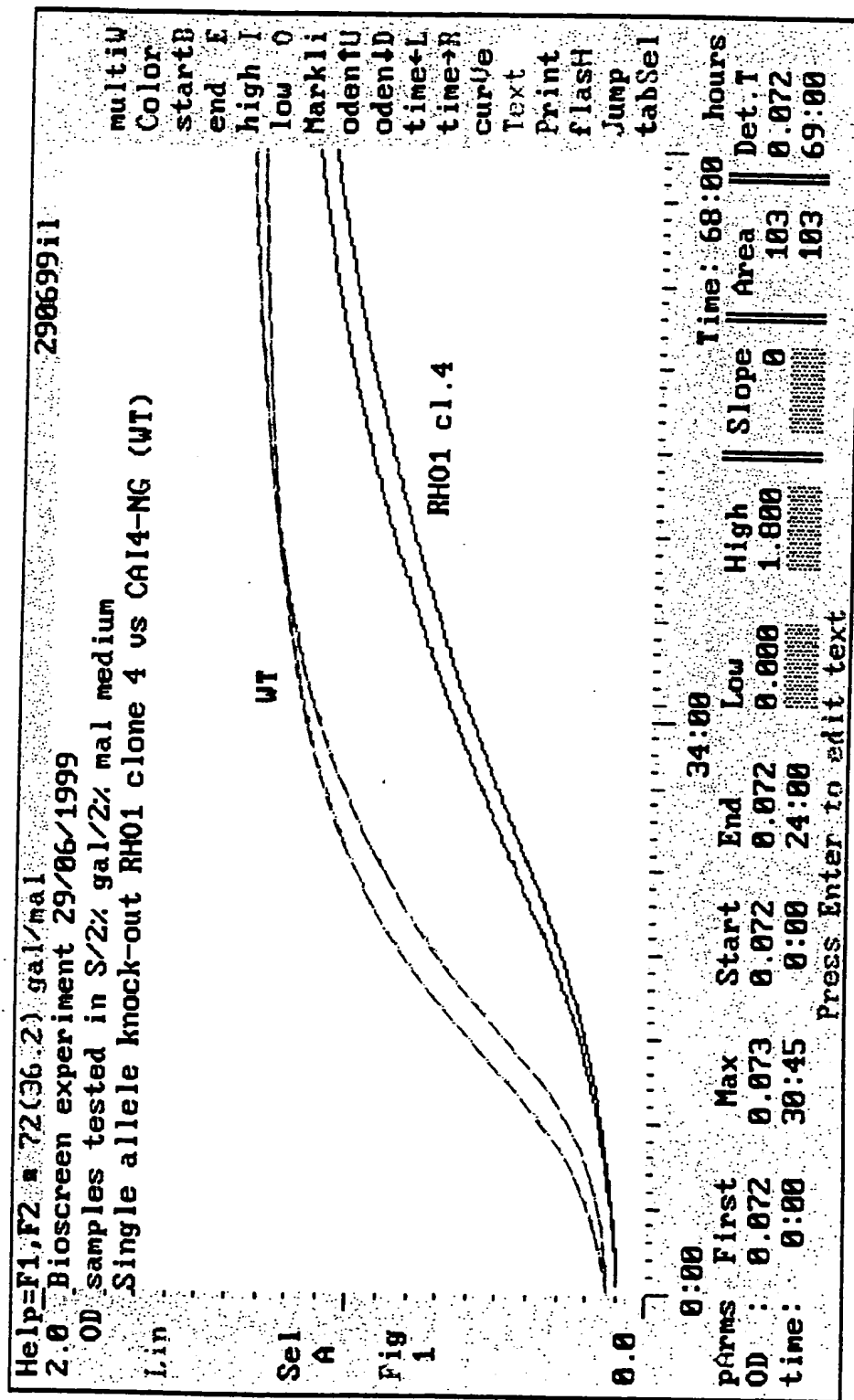
FIG 75



Inoculum for SAM2 was somewhat higher; at equal inocula growth of SAM2 single allele knock-out is slightly slower.

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FIG. 76.



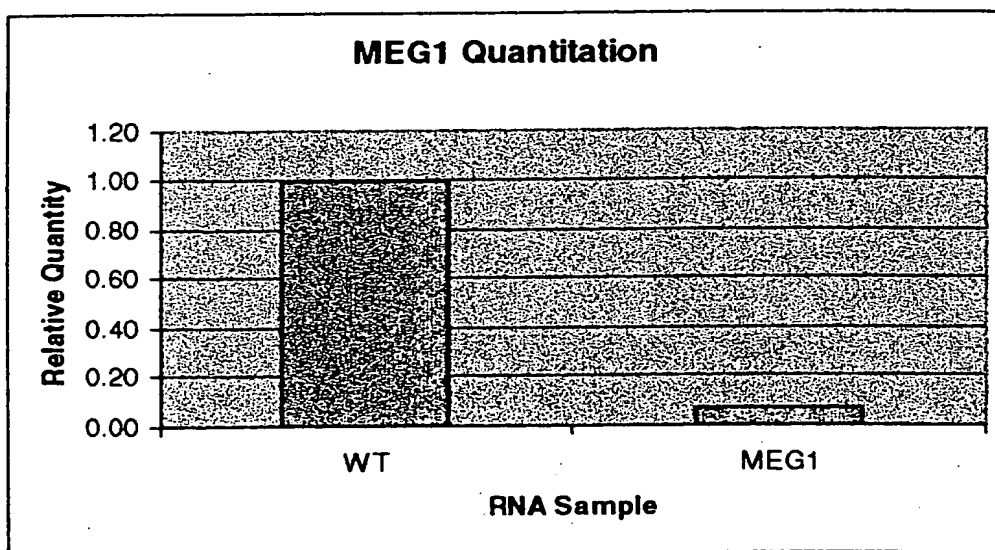
Growth of the RHO1 single allele knock-out is impaired compared to wild type growth.

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FIG. 77

Relative quantitation for MEG1 vs. Act

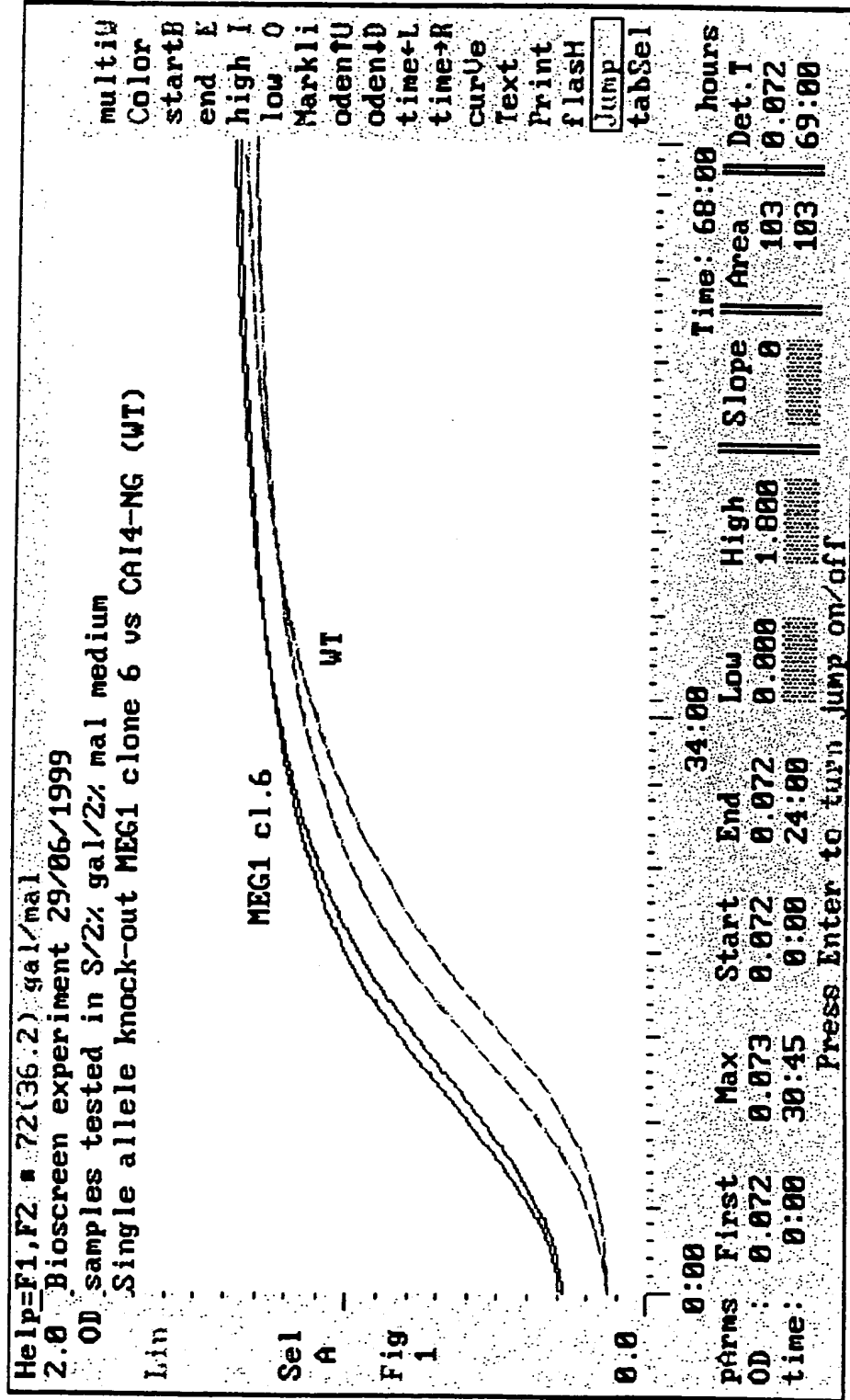
	Avrg. MEG1	Avrg. ACT	dCt	ddCt	2-ddct
WT	35.79	33.49	2.29	0.00	1.00
MEG1	38.62	32.57	6.05	3.76	0.07



MEG1 expression was decreased more than 14 fold in the MEG1 single allele knock- out compared to the Wt.

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FIG. 78.



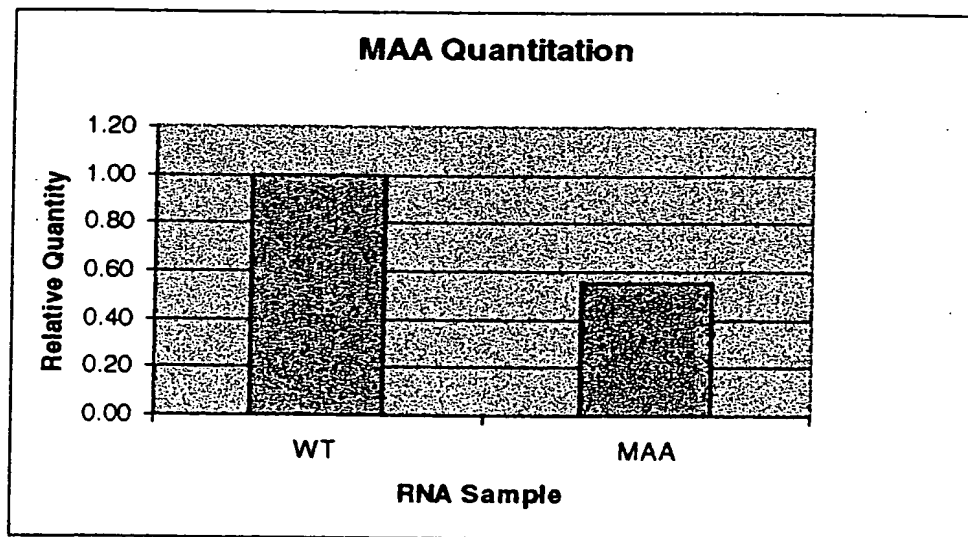
Inoculum for SAM2 was somewhat higher; at equal inocula growth of SAM2 single allele knock-out is slightly slower.

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FIG. 79.

Relative quantitation for MAA vs. Act

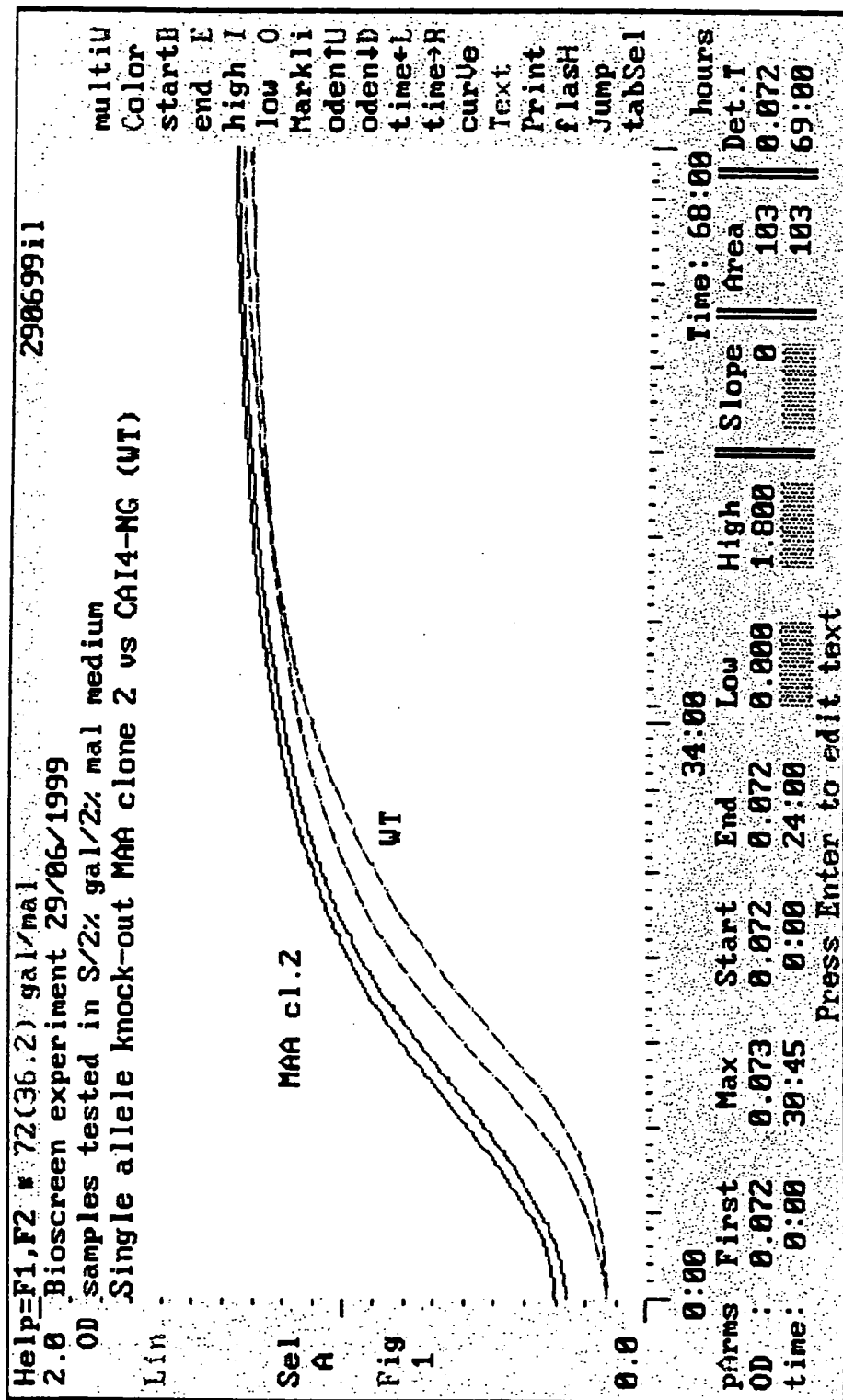
	Avrg. MAA	Avrg. ACT	dCt	ddCt	2-ddct
WT	34.85	33.49	1.36	0.00	1.00
MAA	32.86	30.64	2.22	0.86	0.55



MAA expression was decreased two fold in the MAA knock-out compared to the Wt.

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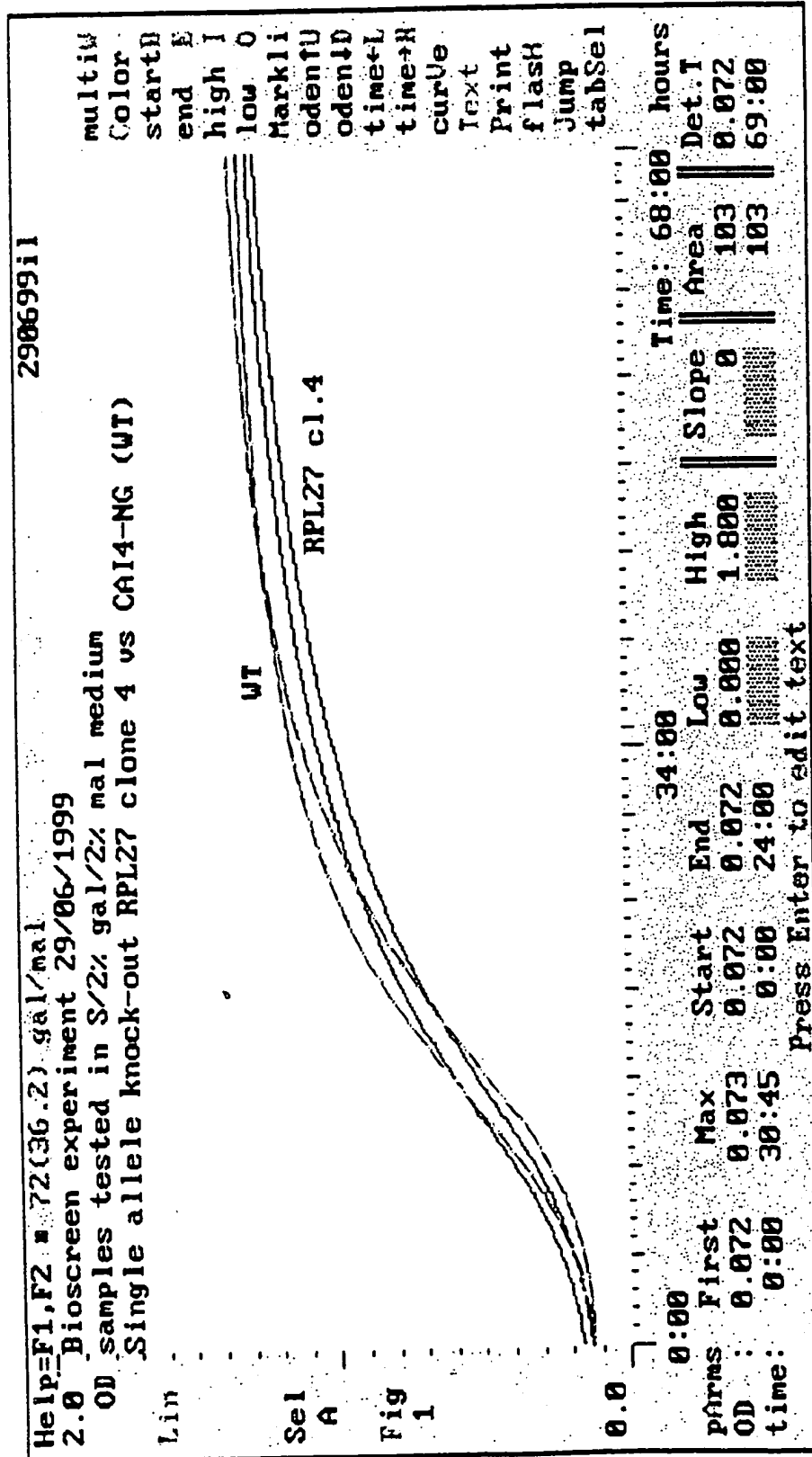
FIG. 80.



Inoculum for MAA was somewhat higher; at equal inocula growth of MAA single allele knock-out is slightly slower.

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FIG. 82.



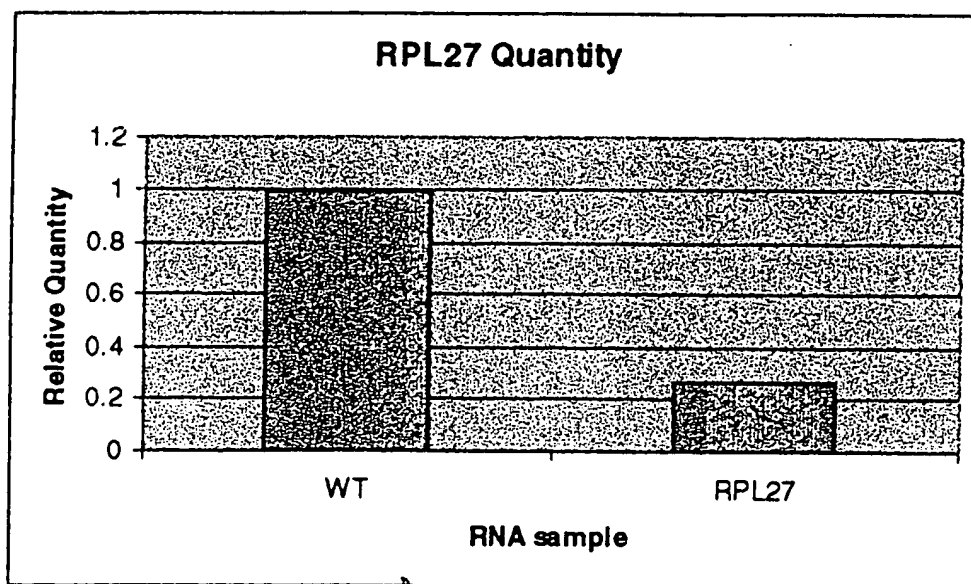
The RPL27 single allele knock-out grows equally to the wild type strain.

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FIG. 81.

Relative quantitation for RPL27 vs. Act

	Avg. RPL27	Avg. ACT	dCt	ddCt	2-ddct
WT	33.01	33.49	-0.48	0.00	1
RPL27 7	34.37	32.98	1.39	1.87	0.27



RPL27 expression was decreased more than three fold in the RPL27 knock-out compared to the Wt.